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THE FAUNA OF BRITISH INDIA

INCLUDING

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Published under the authority of the Secretary of State for India in Council.

EDITED BY SIR ARTHUR E. SHIPLEY G.B.E., Sc.D. Cantab., HON. D.Sc. Princeton, HON. LL.D. Michigan, F.R.S.

BIRDS.—VOL. IV.

(Second Edition.)

BY

E. C. STUART BAKER, O.B.E., F.Z.S., Etc.

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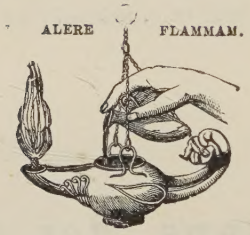

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Vol. IV

PREFACE BY THE EDITOR.

THE present volume contains the same orders and families of birds as does the first edition of Volume III. with the exception of the *Eurylæmidæ* and *Pittidæ* which were included in the Passeres in this edition, and the *Accipitres*, the inclusion of which would have extended the present volume to over 700 pages.

The first four volumes of the present edition contain 1703 species and subspecies, as against 1617 in the same number of volumes of the previous edition containing the complete avifauna of India as accepted at the time they were written.

The number of species described (in the first edition), corresponding to the Orders dealt with in the new edition up to date, were only 1188, so that, roughly speaking, the recognition of subspecies, plus the addition of entirely new species and subspecies, has added about one-third to the total number of forms to be dealt with.

The most notable feature of the present volume is the great amount of new matter recorded in connexion with the life-history of the birds themselves. Much of this has been the result of personal observation by the present author.

A. E. SHIPLEY.

Christ's College Lodge,
Cambridge,
27th June, 1927.

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INTRODUCTION.

In the first three volumes we have dealt with the great order of Birds known as the *Passeres*, or Perching Birds; a vast assemblage of families the inter-relationship of which is very close, although divergencies on minor points are so numerous. The *Passeres* are, however, now almost universally accepted as being very closely allied to the *Coraciiformes* and to constitute with them one of the great divisions of *Aves* known as the *Pico-Passeres*. It is probable, if not absolutely certain, that these two groups, the *Passeres* and *Coraciiformes*, are divergent branches of a common stock and are more nearly related to one another than to any other group of the *Neognathæ*.

The present work is obviously not one in which Systematic Ornithology can be treated at any great length. The Volumes are intended to serve, primarily, as aids to the Field Naturalist to enable him to identify his birds and to learn what is known about them and what still remains to be learnt. It is, of course, also hoped that the "Birds of India" may prove a stimulus to a still more intensive study of the Avifauna of this great and interesting region. Much yet remains to be found out and recorded in reference to our Indian birds. For instance, migration, both local and general, is as yet hardly understood; the causes of geographical variation are but vaguely known; the life-history of many species, including their nidification, food, song, flight, etc. is still a sealed book. At the same time it is obvious that the reader will desire to know how the arrangement of the various Orders, Sub-Orders and Families have been arrived at and why this special classification has been adopted.

As regards the *Passeres* we have already shown in Vol. I. that these birds are separated from all others by certain characters, chief among which we may note the more complex syrinx and the incomplete muscle formula, but, as already remarked, we consider that in spite of these differences they are more nearly related to the *Coraciiformes* than to any other Order or Group.—

Intensive specialization has gone far in many groups to obscure the evidence as to derivation. Fortunately, however, some groups have not advanced so far and still retain characters which afford us clues to what we are seeking, *i. e.* the common ancestry of the *Pico-Passeres*.

These clues, as has been suggested by Pycraft, are furnished by the Touracos, for these birds display many significant points of agreement with the Hoatzin, *Opisthocomus*, and these are augmented and confirmed by other characters furnished by the myology, convolutions of the intestines, vascular system, etc.

It is impossible to consider all these characters in detail, but there are two features which are especially noteworthy. In the first place the feet of the nestlings of both the Hoatzin and the Touracos are incipiently zygodactylous and, secondly, the development of the wing in the nestling Touraco follows exactly the same course as that of the Hoatzin. On the other hand, we know that the Touracos are still more closely related to the Cuckoos, so that here we have a tangible basis for our classification of the *Pico-Passeres*.

At the same time the genus *Opisthocomus* presents certain characters which are generally acknowledged as showing affinities to the *Galli*, *Pterocli* and *Columbæ* so that systematists can regard the genus as being more or less a connecting link between these Groups and the *Pico-Passeres*. If, therefore, the Touraco is derived from the Hoatzin, or if, as is more likely, both are derived from a common stock, what are the inferences to be drawn from an acceptance of this theory?

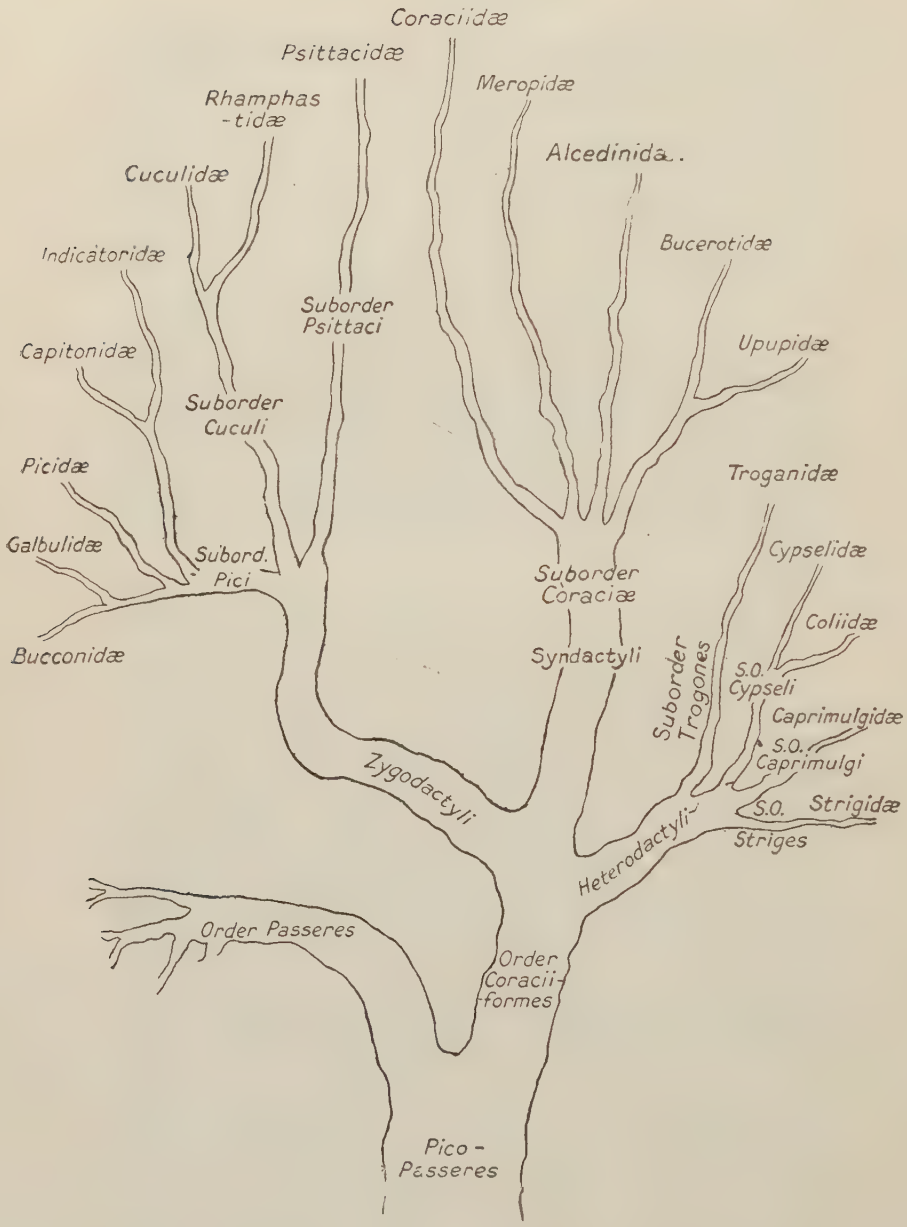
The *Galli*, *Opisthocomi* and *Columbæ* are, admittedly,

derivatives from a common stock. All have the same thigh-muscle formula; but whilst the wings of the *Galli* and *Opisthocomi* are eutaxic, those of the *Columbæ*, with but few exceptions, are diastataxic. The *Pico-Passeres* contain both muscle formulæ and both types of wing. The young Touraco and Hoatzin both have incipiently zygodactylous feet; but whereas the adult Touraco has this type of foot fully developed, it is quite lost in the mature Hoatzin. Furthermore, although the Hoatzin shares with the Touracos and Cuckoos a number of important characters, it differs fundamentally in certain others. Thus the palate is schizognathous, the pterylosis is markedly different and the mature foot is not zygodactylous. We may therefore accept the inference that in some ancestor of the Hoatzin we have the source of the great group of *Pico-Passeres*, although the Hoatzin itself is definitely severed from this group and more nearly allied to others.

The characters of each Sub-Order of the *Coraciiformes* are each dealt with fully in their proper place and it is therefore unnecessary to deal with them here. This Order as a whole, however, emphasizes the remark so often made that no classification of the *Aves* or any of their great groups can be dealt with in consecutive order. All spring from a common stock and have diverged in the course of time as circumstances compelled variation therefrom. The genealogical tree in the accompanying Fig. A shows the probable growth of the various sub-orders and families and, it is hoped, will be easier to understand than many pages of explanation.

Fig. B gives figures showing the Structure of the Palate and Fig. C the Muscles of the Thigh.

FIG. A.

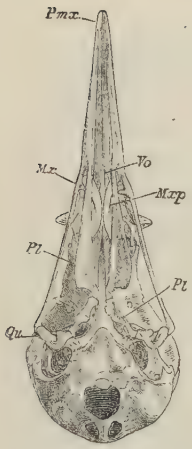


Phylogenetic Tree.

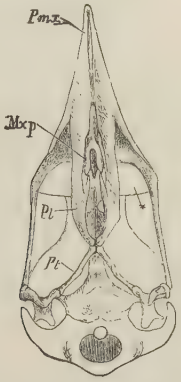
To show approximately the inter-relationship of the Orders, Sub-Orders and Families of the Division of *Pico-Passeres* dealt with in the present and three preceding Volumes of the present edition of the Avifauna of the Indian Empire.

FIG. B.

Illustrating Structure of Palate.



Under view of the skull of *Charadrius pluvialis*, to illustrate the schizognathous type of palate.



Under view of the skull of *Cuculus canorus*, to illustrate the desmognathous type of palate.

These two figures are copied by permission from the late Prof. Huxley's paper on the Classification of Birds (P. Z. S. 1867, pp. 427, 444).—*Pmx*, the premaxilla; *Mx*, the maxilla; *Mxp*, its maxilo-palatine process; *Pl*, the palatine bone; *Vo*, the vomer; *Pt*, the pterygoid; *Qu*, the quadrate bone; × the basipterygoid process; * the prefrontal process.

"In the large assemblage of birds belonging to the Cuvierian orders Gallinæ, Grallæ, and Natatores, which may be termed *Schizognathous*, the vomer, sometimes large and sometimes very small, always tapers to a point anteriorly; while posteriorly it embraces the basisphenoidal rostrum, between the palatines.

"The maxillo-palatines are usually elongated and lamellar; they pass inwards over the anterior processes of the palatine bones, with which they become united, and then bending backwards, along the inner edge of the palatines, leave a broader or a narrower fissure between themselves and the vomer and do not unite with it or with one another."—HUXLEY, P. Z. S. 1867, p. 426.

"In *Desmognathous* birds the vomer is often either abortive, or so small that it disappears from the skeleton. When it exists it is always slender and tapers to a point anteriorly.

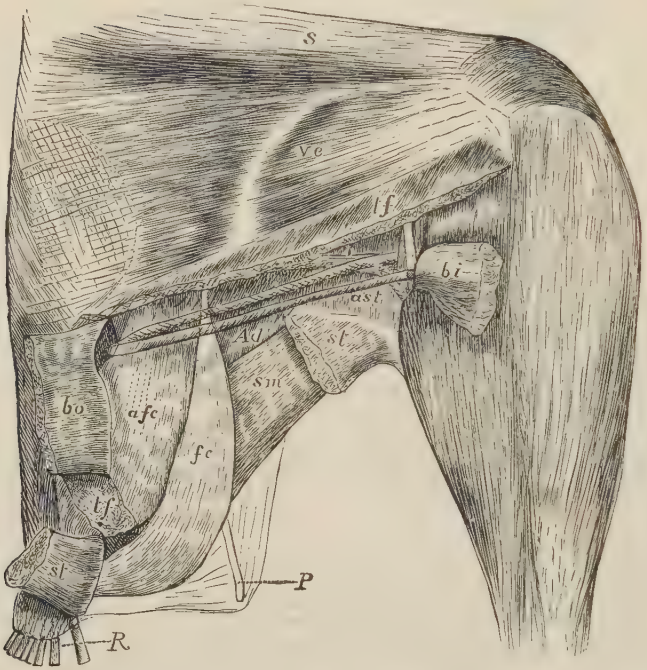
"The maxillo-palatines are united across the middle line, either directly or by the intermediation of ossifications in the nasal septum.

"The posterior ends of the palatines and the anterior ends of the pterygoids articulate directly with the rostrum, as in the preceding division" [and not with the diverging posterior ends of the vomer as in Dromæognathous birds and generally in Ratitæ].—HUXLEY, *l. c.* p. 435.

In the *Ægithognathous* type of palate (figured Vol. I. of the present work, p. 4), "the vomer is a broad bone, abruptly truncated in front, and deeply cleft behind, embracing the rostrum of the sphenoid between its forks. The palatines have produced postero-external angles. The maxillo-palatines are slender at their origin, and extend inwards and backwards obliquely over the palatines, ending beneath the vomer in expanded extremities, which do not become united by bone, either with one another or with the vomer."—HUXLEY, *l. c.* p. 450.

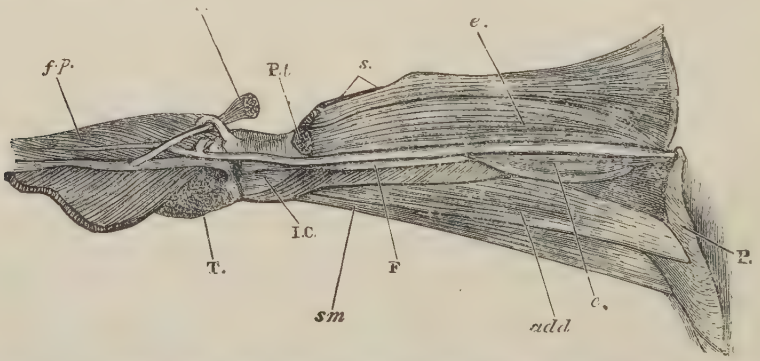
FIG. C.

Illustrating Muscles of Thigh.



Outer view of right thigh of Common Fowl, partially dissected. (Copied from Garrod's figure, P. Z. S. 1873, p. 627.)

s, sartorius; *ve*, vastus externus; *bo* and *bi*, biceps origin and insertion; *tf*, tensor fasciæ (gluteus primus); *fc*, femoro-caudal; *afc*, accessory femoro-caudal; *st*, semitendinosus; *ast*, accessory semitendinosus; *sm*, semimembranosus; *Ad*, adductor; *P*, pubis; *R*, rectrices.



Thigh of Touraco (*Corythaix*) viewed from the inner side, to show the ambiens muscle, arising from the prepubic side of the pelvis (P) and running along to blend with one of the tendons of origin of the flexor perfor. digitorum (*f.p.*).—F, femur; *Pt*, patella; I.C., inner condyle of femur; T, tibia; *b*, biceps (cut short); *s*, sartorius (also cut); *e*, *e*, extensor femoris; *sm*, semimembranosus; *add*, adductores.

N.B.—The surrounding parts have been somewhat distorted from their natural positions to show better the course of the ambiens. (Copied from Forbes's figure, Ibis, 1881, p. 9.)

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Order II. CORACIIFORMES.

In the first edition of the Avifauna the authors having dealt with the *Passeres*, in which, however, they did not include the *Eurylæmi* or Broadbills, divided the birds contained in the present volume into Orders. These were as follows : *Pici*, *Zygodactyli*, *Anisodactyli*, *Macrochires*, *Podargi*, *Trogones*, *Coccyges*, *Psittaci*, *Striges* and *Accipitres*. Of these ten all but the last, the *Accipitres*, are now generally accepted as being more or less interrelated and in consequence are all included in the *Coraciiformes*, Blanford's Orders with but slight alterations being reduced to the rank of Suborders. Pycraft has from time to time dealt with many of the various characters which differentiate the two Orders the *Coraciiformes* and the *Passeres* or *Passeriformes*. For the purpose of this work it is unnecessary to go at any great length into his researches, but briefly they may be summarised as follows.

The *Coraciiformes* have two carotids whereas the *Passeres* have but one.

In the former the toes are either Syndactylous, Heterodactylous or Pamprodactylous, whereas in the latter they are Eleuthero-dactylous.

The *Coraciiformes* have both *spina externa* and *spina interna* or these two fused to form a *spina communis*, whilst the proximal ends of the clavicle are not expanded. The *Passeres* on the other hand have no *spina interna* but have the ends of the clavicle expanded.

In the *Coraciiformes* the oblique septa are attached on each side of the sternum and the falciform ligament forms a median septum attached to the middle line of the sternum. In the *Passeres* the oblique septa are not so attached but meet one another, as well as the falciform ligament, in the middle line below the liver.

In the *Coraciiformes* the wing is sometimes Eutaxic and sometimes Diastataxic but in the *Passeres* it is always the former.

The birds we are now dealing with have the lesser and median coverts with proximal overlap or with more than one row of lesser coverts with proximal overlap. In the birds dealt with in the previous volumes there is one row of lesser coverts with distal overlap and one row of median with proximal overlap.

Finally in the present Order the *patagialis brevis* tendon ends in the *extensor metacarpi radialis longus* whilst in the *Passeres* it ends in the extensor condyle of the radius.

Fig. 1.—*Brachypternus b. benghalensis* and nest-hole.

Suborder **PICI.**

The Suborder *Pici* contains six groups of birds, *Picidæ*, *Capitonidæ*, *Indicatoridæ*, *Galbulidæ*, *Bucconidæ* and *Rhamphastidæ*, of which the first two are represented in India by numerous species and the third by one only. The remaining three groups are not found within the limits of this work. Amongst themselves the three groups differ in many sharply defined ways, but all are alike in having the plantar tendons of the foot the same: i. e., the *flexor longus hallucis*, after sending off a vinculum to the *flexor perforans digitorum*, is divided, one branch going to the fourth toe, the other being again divided to supply the first and second, whilst the *flexor perforans digitorum* runs to the third alone (see fig. 2, p. 3). In all six groups the gall-bladder is of great length and of tubular form. These two characters suffice to distinguish this Suborder from all others.

Key to Families.

A. Palate saurognathous ..... **Picidæ**, p. 3.

B. Palate ægithognathous.

a. Tail-feathers 12, primaries 9 ..... **Capitonidæ**, p. 102.

b. Tail-feathers 10, primaries 10 ..... **Indicatoridæ**, p. 131.

Family PICIDÆ.

The Woodpeckers belong to the great group of Zygodactylous birds, having two toes pointing forward and two backward, the fourth toe being directed backward as well as the first or hind toe. They are, however, separated from the *Cuculidæ*, *Musophagidæ* and *Psittacidæ*, other zygodactylous birds, by the combination of the two characters given above.

Fig. 2.—Tarsus and foot of *Cyanops asiatica asiatica* from behind, dissected to show the deep plantar tendons, the *f. long. hallucis* on the right in the upper part of the figure, the *f. perf. digitorum* on the left. (Garrod, P.Z.S. 1875, p. 346.)

The palate is saurognathous. The vomer is represented by several distinct paired rods; the maxillo-palatines are small and widely separated from each other.

The sternum has two notches behind on either side of the keel; the manubrial process bifurcate as in the *Passeres*. Of the thigh muscles the Femoro-caudal and Semitendinosus are present, the Ambiens and Accessory Femoro-caudal absent. Cæca

wanting or rudimentary. The thoracic vertebræ are free. As regards the pterylosis, the spinal feather-tract is well marked and is forked on the lower but not on the upper back. The oil-gland is tufted, not nude as in the *Passeres*.

The tongue is extremely long and protractile and when in use is covered with a thick, adhesive secretion from the salivary

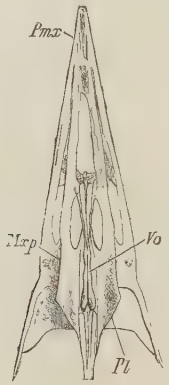

Fig. 3.—Palate of *Picus viridis* (Huxley, P.Z.S. 1867, p. 448). *Pmx*, premaxillæ; *Mxp*, maxillo-palatine; *Pl*, palatine; *Vo*, the ossicles which appear to represent the vomer.

glands. The hyoid cornua slide round the skull, passing in a sheath from the side of the gullet round the occiput to the base of the upper mandible. The point of the tongue is horny and barbed.

Tail-feathers twelve, the outermost pair very short. The bill is stout, often wedge-shaped, and the nostrils are basal. In many genera a ridge of varying proportions and position runs some way down on either side of the bill.

Key to Subfamilies.

A. Shafts of tail-feathers stout and rigid ..... *Picinæ*, p. 5.

B. Shafts of tail-feathers soft and flexible.

a. Tail less than $\frac{2}{3}$ length of wing; nostrils concealed by plumes ..... *Picumninæ*, p. 92.

b. Tail exceeding $\frac{3}{4}$ length of wing; nostrils not concealed but partly covered by a membrane ..... *Iynginæ*, p. 98.

Subfamily PICINÆ.

This Subfamily contains the true Woodpeckers with hard rigid tails which they use as aids in climbing by pressing against the surface of the tree. The bill is nearly always stout and strongly developed.

Key to Genera.

A. Primaries spotted or banded.
  a. Nostrils concealed by plumes.
    a'. Four toes.
      a''. Mantle wholly or partly green; back not barred.
        a^3. Culmen almost straight; a distinct nasal ridge ..... PICUS, p. 6.
        b^3. Culmen curved; nasal ridge obsolete ..... CHRYSOPHLEGMA, p. 23.
      b''. Mantle chiefly crimson; back barred ..... CALLOLOPHUS, p. 25.
      c''. Mantle black and white.
        c^3. Nasal ridge less than half length of bill and nearer commissure than culmen at the base .... HYPOPICUS, p. 29.
        d^3. Nasal ridge half or more than half length of bill and about half way between culmen and commissure.
          a^4. Second primary shorter than sixth.
            a^5. Primaries exceeding secondaries by length of culmen or more ..... DRYOBATES, p. 32.
            b^5. Primaries exceeding secondaries by less than length of culmen..... LEIOPICUS, p. 45.
          b^4. Second primary longer than sixth..... YUNGIPICUS, p. 48.
    b'. Toes three only.
      d''. Mantle green or red ..... GECINULUS, p. 27.
      e''. Mantle golden olive ..... CHLOROPICOIDES, p. 75.
  b. Nostrils exposed.
    c'. Mantle rufous or crimson, more or less banded.
      f''. Culmen nearly straight; tip truncated ..... BLYTHIPICUS, p. 55.
      g''. Culmen curved; tip pointed .... MICROPTERNUS, p. 61.
    d'. Mantle golden olive or crimson, not banded.
      h''. Toes four.
        e^3. Hallux large, about half length of second toe ..... CHRYSOCOLAPTES, p. 76.

*f*³ Hallux small, about one-third length of second toe	BRACHYPTERNUS, p. 66.
i''. Toes three.....	DINOPICUS, p. 72.
e'. Mantle black or brown and buff	MIGLYPTES, p. 57.
B. Primaries without spots or bands.	
c. Inner secondaries with large spots; wing under 105 mm.....	HEMICIRCUS, p. 82.
d. No spots on inner secondaries; wing over 180 mm.	
f'. Plumage nearly all ashy-grey	MULLERIPICUS, p. 86.
g'. Plumage mostly black	THRIPONAX, p. 87.

Genus **PICUS**.

Picus Linn., Syst. Nat., 10th ed. i, p. 113 (1758).

Type, *Picus viridis* Linn.

In this genus the nostrils are concealed by harsh plumes; culmen slightly curved; a distinct nasal ridge nearer to the culmen than to the commissure at the base of the bill; foot with four toes, the outer front toe longer than the outer hind toe; tail less than two-thirds the length of the wing and strongly graduated, the outermost feathers shorter than their coverts; sexes generally differing, the males having red on the crown and the females none, whilst, in this respect, the young resemble the female.

Key to Species.

A. Rump green or yellow.	
a. Lower parts streaked; male with crimson, female with black cap.	
a'. Tail barred throughout	*P. squamatus*, p. 6.
b'. Tail not barred throughout.....	*P. vittatus*, p. 9.
b. Lower parts practically uniform; crown crimson and occiput black in male, both black in female	*P. canus*, p. 13.
c. Lower parts barred; a yellow nuchal spot in both sexes	*P. chlorolophus*, p. 16.
d. Lower parts barred and spotted on flanks only	*P. puniceus*, p. 20.
B. Rump bright red	*P. erythropygius*, p. 22.

Picus squamatus.

Key to Subspecies.

A. Darker; under plumage feathers with broad dark brown edges	*G. s. squamatus*, p. 7.
B. Much paler; edges of feathers of under plumage very narrow and pale	*G. s. flavirostris*, p. 8.

(1337) Picus squamatus squamatus.

THE SCALY-BELLIED GREEN WOODPECKER.

Picus squamatus Vigors, P. Z. S., 1831, p. 8 (Himalayas, Simla-Almora Dist.).
Gecinus squamatus. Blanf. & Oates, iii, p. 19.

Vernacular names. *Tuktola* (Chamba).

Description.—Male. Crown and crest crimson; lores and supercilium white; edge of forehead and line above supercilium black; back, scapulars and wing-coverts dull grass-green, often suffused with greyish; rump and upper tail-coverts green; the feathers edged with bright yellow, sometimes wholly obscuring the green; tail blackish-brown with interrupted bars of white, fulvous-white or rufous-white; primaries dark brown barred with white on the outer webs and on the bases of the inner webs; innermost secondaries suffused with green and with faint bars of greenish-fulvous; outer secondaries gradually grading into the primaries; a line under the eye and a broad moustachial streak black; cheeks whitish grading into the dull pale green of the ear-coverts and sides of the neck; chin and throat pale greyish-green, darkening somewhat on the fore-neck and breast; abdomen, flanks, under wing-coverts and under tail-coverts yellowish-greenish or greyish-white, each feather subedged with a bold black line running all round the contour of the feather; very rarely the shafts also show black lines.

Colours of soft parts. Iris in two rings, the inner red or crimson-pink surrounded by paler pink; bill horny-yellow, dark at the tip and more yellow on the base of the lower mandible; legs dull yellowish-green to greenish-slate.

Measurements. Total length about 350 to 360 mm.; wing 155 to 172 mm.; tail 127 to 136 mm.; tarsus about 27 mm.; culmen 27 to 33 mm.

Female. Similar to the male but with the crown and crest black and the general tone of the plumage duller and less green; the feathers of the forehead have grey centres.

Young birds are like the female but have the breast-feathers also squamated like the abdomen though less boldly so.

Distribution. Himalayas from Afghanistan, Baluchistan and Gilgit to Sikkim.

Nidification. The Scaly-bellied Green Woodpecker breeds in the Western Himalayas between 3,000 and 8,000 feet, most plentifully between 4,000 and 6,000 feet though it is common in the Simla Hills up to 7,500 feet or over. It generally selects a tree with "heart-shake" or decayed centre, boring through the hard outer part for a few inches and then turning straight down, either continuing to bore for two or three feet through

the softer material and then finishing with a chamber for the eggs or, if the tunnel breaks into an opening, it makes use of the bottom of the natural hollow upon which to deposit its eggs. The tunnel may be bored at any height from the ground, from six to forty feet, but more are made under than over twenty feet. Any kind of tree is used so long as it is surrounded with forest. The eggs usually number six though five, or even four only, are sometimes laid. They are, like nearly all Woodpeckers' eggs, glossy china-white, with very hard shells of fine texture; many eggs are broad ovals with sharply pointed smaller ends but they vary very considerably in this respect. Fifty eggs average 31·0 × 22·6 mm.: maxima **32·5** × 23·8 and 31·3 × **24·0** mm.; minima **28·3** × 22·2 and 30·3 × **21·3** mm. They are early breeders, most birds laying in April, a considerable number in May and a few in the last week of March.

Habits. This Woodpecker is a bird of the forest, both deciduous and evergreen, but is also commonly seen in more open well-wooded country. Its flight is rather heavy and it proceeds by alternate flappings and closing of wings, causing it to dip deeply as it flies; when undisturbed its flight is leisurely but it is capable of considerable speed when frightened. It is a noisy bird and its raucous voice may be heard constantly wherever it is at all common, more especially in the mornings and evenings. Like all Woodpeckers it feeds principally on trees, running up and all round the trunks and bigger branches, incessantly hammering the bark and searching for grubs and insects, seizing those which take fright at its hammering and bolt, or tearing off the protecting bark from those which refuse to be stampeded. This genus also feeds sometimes on the ground, proceeding by most ungainly hops, the tail, so useful on the tree, looking a great impediment on the ground where it is always held low. It feeds largely on ants and termites but will eat any insect food and even small worms.

(1338) Picus squamatus flavirostris.

HARGITT'S SCALY-BELLIED WOODPECKER.

Gecinus flavirostris Menzbier, Bull. Nat. Moscou, p. 440 (1886) (Murghab, Afghanistan).
Gecinus gorii. Blanf. & Oates, iii, p. 20.

Vernacular names. None recorded.

Description. Similar to *P. s. squamatus* but much paler everywhere and with the pale markings broader and the dark markings more narrow, the brown squamations on the lower plumage being very narrow; the lower plumage is much suffused with yellow.

Colours of soft parts and **Measurements** as in the preceding bird.

Distribution. South Afghanistan and Baluchistan. There are two specimens in the British Museum Collection, one from Quetta and one, rather darker, from Padda Sultan on the Helmund River. Sir O. B. St. John saw what he believed to be this form on the Kwaja Amran Hills and probably in the juniper forests on Ziarat near Quetta. Meinertzhagen also obtained one specimen near Quetta and saw others.

Nidification. Unknown.

Habits. Similar to those of the last bird, so far as is known, but it seems to be a very rare bird. Those seen by Meinertzhagen were feeding on insects on the Olive and Babool trees on the sides of the roads.

Picus vittatus.

Picus vittatus Vieill., Nouv. Dict. d'Hist. Nat., xxvi, p. 91 (1818).

Type-locality: Java.

The typical form differs from *P. v. eisenhoferi* in being rather less striped below and from our three other Indian races in having the upper breast immaculate instead of striped.

It is exceeding difficult to decide the status of *P. v. vittatus*, *P. v. myrmecophaneus*, *P. v. dehræ* and *P. v. viridanus*. The differences are little beyond the degree of striping or squamation on the lower plumage; fortunately the British Museum possesses about 300 skins of this species and this fine series shows that they can be fairly well divided on the characters given in the key below.

Key to Subspecies.

A. Chin and throat boldly striped or squamated like the rest of the plumage; moustachial streak faint.
  a. Smaller: wing 110 to 130 mm.; nearly always under 125 mm. ..... *P. v. myrmecophaneus*, [p. 10.
  b. Larger: wing 134 to 145 mm.; nearly always over 136 mm. ..... *P. v. dehræ*, p. 11.
B. Chin and throat immaculate or weakly striped; breast squamated like the abdomen; moustachial stripe dark.. *P. v. viridanus*, p. 12.
C. Chin, throat and upper breast all practically immaculate and not squamated like the abdomen ..... *P. v. eisenhoferi*, p. 12.

The difficulty in dividing this species into geographical races is increased by the great individual variation and the ill-defined boundaries to various races; the above four, however, all seem to have a well-defined breeding area within which each breeds, though on the outer limits of these boundaries the forms are more or less intermediate.

(1339) Picus vittatus myrmecophaneus.

THE LITTLE SCALY-BELLIED GREEN WOODPECKER.

Picus myrmecophaneus Stresemann, Verh. Orn. Ges. Bay., xiv, 4, p. 289, Dec. 1920 (Nepal).
Gecinus striolatus. Blanf. & Oates, iii, p. 20 (part).

Vernacular names. None recorded.

Description.—Male. Crown and crest crimson, the posterior feathers sometimes tipped with orange and with some black almost invariably showing on the nape; back and wing-coverts grass-green, sometimes tinged with yellow, sometimes more olive; rump bright yellow, rarely tinged with orange; wing-quills as in *P. s. squamatus*; tail greenish-brown, faintly barred with paler at the base, the outermost pair paler brown and more boldly barred throughout; a white supercilium from the eye to the nape with a black line above it; lores dull fulvous-white; ear-coverts pale

Fig. 4.—Head of *P. v. myrmecophaneus.*

grey-brown, streaked paler; cheeks greyish-white faintly streaked with black; chin and throat fulvous-grey streaked with white; fore-neck and breast more green with faint darker squamations; abdomen, flanks and under tail-coverts pale greenish-fulvous boldly squamated with black.

The depth of colour on the underparts varies greatly.

Colours of soft parts. Iris red, with an outer ring of pink; eyelids slate-colour or plumbeous; bill horny-yellow, the upper mandible darker and browner; legs and feet olive-green or olive-slate.

Measurements. Total length about 300 mm.; wing 122 to 130 mm.; tail 83 to 93 mm.; tarsus 25 to 26 mm.; culmen 25 to 30 mm.

Female. Similar to the male but with the crown and crest black instead of crimson and the sides of the head rather duller and browner.

Distribution. Ceylon, South India, the Bombay Presidency, Eastern Nepal, Sikkim and Bhutan Duars to Eastern Assam, Cachar and Manipur; Chin Hills in Burma.

Nidification. The Little Scaly-bellied Woodpecker lays from three to five eggs during March, April and May, boring its nest-holes either in the trunk of the tree or in the larger branches, generally at some height between 10 and 20 feet from the ground. The entrance is much smaller than that of the last bird, barely 2″ across instead of 2½″, but otherwise the tunnel and chamber are much the same. It seems to select trees standing in forest in most cases but occasionally breeds in orchards and open country. The eggs are of the usual glossy white, broad ovals in shape, decidedly compressed at the smaller end and measure about 26·6 × 20·3 mm.

Habits. This Woodpecker is resident in the foothills and lower ranges wherever found, wandering up to some five thousand feet both in the Eastern Himalayas and hills of Southern India. Bourdillon found it resident and breeding in the plains of Travancore, but it nearly always keeps to the hills or the broken country adjacent to them. In flight it is very like *Picus squamatus*, but its note is much less discordant and the sound of its tapping is, also, less resonant and far-reaching. It feeds much on the ground as well as on fallen trees and moss-covered boulders, ants, undoubtedly, forming a large portion of its diet.

(1340) Picus vittatus dehræ.

THE HIMALAYAN SCALY-BELLIED WOODPECKER.

Picus vittatus dehræ Stuart Baker, Bull. B. O. C., xlvi, p. 69 (1926) (Dehra).
Gecinus striolatus. Blanf. & Oates, iii, p. 20 (part).

Vernacular names. None recorded.

Description. Differs from the preceding form in being decidedly bigger. As a whole the colour is paler and brighter but individual variation is great and the race could not be maintained on colour alone.

Colours of soft parts as in *P. v. myrmecophaneus.*

Measurements. Wing 136 to 145 mm.: tail 88 to 93 mm.; tarsus about 26 mm.; culmen 29 to 33 mm.

Distribution. Himalayas in the lower ranges from Kuman to Garhwal and West Nepal. Eastern Nepal birds are intermediate between this and the last race, but the majority have wings under 130 mm. in length and must, for the present, be retained under *P. v. myrmecophaneus*, of which the type locality is unfortunately given as Nepal.

Nidification. Breeds in the Western Himalayas from some 2,500 to 7,000 feet, from April to June, principally in the latter

half of May, laying three to five eggs. The nest-holes seem to be bored indifferently in any kind of tree, Deodar, fruit tree, or any forest tree and to be at any height from the ground from five to forty feet, though more often under twenty feet than over. Eggs taken by Whymper and Ward measure about 27·4 × 20·8 mm.

Habits. Similar to those of the other races but keeping much to dense forest and only occasionally coming into open country and orchards.

(1341) Picus vittatus viridanus.

THE BURMESE SCALY-BELLIED WOODPECKER.

Picus viridanus Blyth, J. A. S. B., xii, 1843, p. 1000 (Arakan).
Gecinus viridanus. Blanf. & Oates, iii, p. 22.

Vernacular names. None recorded.

Description. Similar to the Indian race, but generally with the chin and throat somewhat less definitely streaked and with the black malar, or moustachial, streak more strongly developed. As a rule also the lower parts are greener and darker and the yellow on the rump is not so extensive or so bright.

Colours of soft parts as in the other races.

Measurements. Wing 125 to 148, but almost invariably over 132 mm.; tail 92 to 104 mm.; tarsus about 26 mm.; culmen 29 to 36 mm., generally over 32 mm.

Distribution. All Burma except the extreme North-West, South to Peninsular Burma and Siam and the Malay States. This race seems to be a Central form and *P. v. vittatus* and *P. v. eisenhoferi*, which are very near one another, the forms of the extreme South and the East.

Nidification. Hopwood found this Woodpecker breeding from February to April at Tharrawaddy and Grant took eggs near Sinlum Kaba in the former month. The nest-holes are made in trees in forest, generally quite low down and the tunnels are short, sometimes a few inches only in length, unless they open into natural hollows. The eggs seem to number two or three only and Hopwood found a single egg hard-set. Ten eggs average 28·3 × 21·4 mm.

Habits. Similar to those of the other races.

(1342) Picus vittatus eisenhoferi.

THE SIAM SCALY-BELLIED WOODPECKER.

Gecinus vittatus eisenhoferi Gyldenstolpe, Ornith. Monatsb., 1916, p. 28 (Pa Hing, N. Siam).

Vernacular names. None recorded.

Description. Differs from all the other races except *P. v. vittatus*

in having the throat and much of the breast almost immaculate, and nearly always suffused with buffy-yellow or greenish-yellow; the malar stripe is very pronounced and the yellow on the rump is generally much restricted and suffused with green.

Colours of soft parts as in the other races.

Measurements. Wing 124 to 144 mm., generally over 130 mm.; tail 95 to 118 mm.; tarsus 26 to 27 mm.; culmen 30 to 33 mm.

Distribution. Siam, Cochin China, Annam, straggling into extreme Eastern Burma, two specimens from Kaukaryet being very well-defined specimens of this race.

Nidification. Herbert found this bird breeding during February in the Bansakai fruit-gardens near Bangkok and also at Samkok. The tunnels were bored in the trunks of "Tonlang" or Durian trees and always at about twenty feet from the ground. In each case there were four eggs in the clutch. Eight eggs average 27·3 × 20·6 mm.: maxima **28·9** × **21·0** mm.; minima **26·1** × **20·2** mm.

Habits. Similar to those of the other races but generally seen in open, though well-wooded, country whilst it also constantly frequents orchards and gardens.

Picus canus.

Picus canus Gmelin, Syst. Nat. i, p. 434 (1788).

Type-locality: Norway.

The typical form *Picus canus canus* differs from all the races found within the limits of this work in its general much paler, greyer tones both above and below. The black on the head of both male and female is either obsolete or very small in amount.

Key to Subspecies.

A. Above darker and more green, no bronze or golden sheen; below darker and greener ..... *P. c. barbatus*, p. 13.
B. Above lighter with a strong bronze sheen; below more tinged with yellow ..... *P. c. gyldenstolpei*, p. 15.
C. Above still lighter, very little bronze sheen; below paler and more grey or buffy ..... *P. c. hessei*, p. 16.

(1343) Picus canus barbatus.

THE INDIAN BLACK-NAPED GREEN WOODPECKER.

Picus canus barbatus Hardwicke's Ill. Orn. i, pl. xxxi, fig. 2 (1831) (Mussoorie, *Stresemann*).
Gecinus occipitalis. Blanf. & Oates, iii, p. 22.

Vernacular names. None recorded.

Description.—Male. Forehead and crown crimson; supercilium

and feathers of the forehead next the bill grey; lores, a line over the supercilium, posterior crown, crest and nape black, more or less marked with grey; sides of neck, back and least wing-coverts rather dark grass-green; rump green tinged with bright yellow; tail black edged paler, the central pair edged at the base and marked with broken bars of dull, pale olive; visible portions of wing-coverts and inner secondaries like the back but with more of a bronze sheen; primaries brown with broken bars of white on the base, increasing on the inner webs towards the tips of the inner primaries and outer secondaries; sides of head and ear-coverts grey, a black line down each side of the throat from the lower mandible; chin and throat greenish-grey, changing gradually to darker dull olive-green on the breast, flanks, abdomen and under tail-coverts; the bases of the feathers are grey and sometimes show through, especially on the abdomen.

Colours of soft parts. Iris dull red to crimson-red; bill brownish-black or plumbeous black to black; legs and feet dull brownish or plumbeous green, the claws more brown.

Measurements. Total length about 310 mm.; wing 154 to 162 mm.; tail 105 to 118 mm.: tarsus 28 to 29 mm.; culmen 40 to 42 mm.

Female. The whole forehead and crown black streaked with grey; the remainder of the plumage as in the male but generally paler and more strongly striped.

Young. Like the female but duller, the tail-feathers more freely and definitely barred and the under plumage also more or less barred.

Distribution. North-West Himalayas to Simla States, Garhwal and possibly Western Nepal.

Nidification. This Black-naped Woodpecker breeds in the Himalayas between 4,000 and 8,000 feet during May and early June. It bores its nest-hole either in dead or living trees, but always in one which is more or less rotten in parts. The entrance is generally a short one, bored horizontally into the hollow or rotten part of the tree, from which sufficient touch-wood is rapidly cut away to form a suitable chamber for the eggs. These number four to six and are of the ordinary china-white and very hard and glossy. Twenty-eight eggs average 29·5 × 22·8 mm.: maxima **31·5 × 23·2** mm.; minima **26·9** × 22·8 and 29·2 × **21·4** mm.

A nest-hole found by Jones led to a chamber below the level of the ground, the entrance being only some six inches above it.

Habits. The Black-naped Woodpeckers are resident wherever found and frequent alike the interiors of the densest evergreen forests, bamboo and deciduous tree-forest, the secondary growth on deserted cultivation and quite open country if well-wooded.

They do not descend so constantly on to the ground to hunt for food as does their European cousin but may often be seen thus occupied. They occur up to about 8,000 feet.

(1344) Picus canus gyldenstolpei.

THE ASSAM BLACK-NAPED WOODPECKER.

Picus canus gyldenstolpei Stuart Baker, Bull. B. O. C., xxxix, p. 19 (1918) (Sadiya, Assam).
Gecinus occipitalis. Blanf. & Oates, iii, p. 22 (part).

Vernacular names. *Mong-chok* (Lepcha); *Dao-ja-gadaiya* (Cachari).

Description. Sex for sex similar to the preceding bird but with a strong golden or bronze sheen over the upper plumage; the under surface is also generally more yellow.

Colours of soft parts as in the other races.

Measurements. Wing 137 to 150 mm., mostly under 145 mm.; tail 98 to 104 mm.; tarsus 27 to 28 mm.; culmen 33 to 38 mm.

Distribution. Eastern Nepal, Sikkim, Assam, Cachar, Sylhet, Comilla, Chittagong, Manipur and Lushai Hills.

Nidification. This Woodpecker breeds throughout Assam to Manipur and the Lushai Hills from the beginning of March to the end of April, a good many birds in the higher ranges laying in May. They are to be found from the level of the plains in the broken ground near the hills up to about 5,000 feet and exceptionally up to 7,000 feet, but they are most common between 1,000 and 3,000 feet. The Indian races of *P. canus*, this included, all seem addicted to boring their nest-holes very low down in the main trunks of trees and I have seen more than one entrance actually between the roots of trees and many only two or three feet from the ground. As a rule the entrance is bored straight into some natural hollow, the eggs, three to five in number, being laid on the rubbish accumulated on the bottom. Occasionally the eggs are deposited in natural hollows and no new entrance is bored, though the narrow opening is always enlarged and shaped. Forty eggs average 28·9 × 22·0 mm.: maxima **32·0** × 22·0 and 29·0 × **23·5** mm.; minima **26·0** × 21·0 and 28·0 × **20·4** mm.

Habits. This is an extremely common bird everywhere under 3,000 feet and its noisy notes and rapid, reverberating taps as it hunts for its food may be constantly heard wherever there is forest of any kind, heavy or thin, evergreen or deciduous. It also freely enters open country, gardens and compounds and feeds both upon trees like other woodpeckers and also on the ground, where it hunts for ants and their pupæ and eggs. Its notes are not so loud and harsh as those of the genera *Chrysophlegma* or

Chrysocolaptes but it is equally persistent in uttering them. Its flight is very heavy and slow unless driven by fright.

(1345) Picus canus hessei.

THE BURMESE BLACK-NAPED GREEN WOODPECKER.

Gecinus canus hessei Gyldenstolpe, Ornith. Monatsb., xxiv, p. 28 (1916) (N. Siam).
Gecinus occipitalis. Blanf. & Oates, iii, p. 22 (part).

Vernacular names. None recorded.

Description. Very similar to *P. c. gyldenstolpei* but with less sheen on the upper plumage, more olive-green. It is also a bigger bird with, in most cases, a larger bill.

Colours of soft parts as in the other races.

Measurements. Wing 144 to 158 mm.; tail 100 to 107 mm.; tarsus about 28 to 29 mm.; culmen 35 to 45 mm.; exceptionally as small as 32 and 33 mm. in the Chin Hills, adjoining Manipur.

Distribution. North, Central and South Burma as far South as Moulmein; Siam North to South, Cochin China and Annam. Robinson and Kloss separate the South-Western Siam and Malay Peninsula form from *P. c. hessei* on the grounds of its smaller bill. They also refer the Annam race to *P. c. occipitalis* (=*barbatus*).

Nidification. The Burmese Black-naped Green Woodpecker breeds from April (*Mackenzie*) to June (*Oates*) but most birds lay in April and May. It lays from three to five eggs, boring entrances into hollows at any height from three to thirty feet from the ground and generally in trees in dense forest, evergreen or deciduous. Thirty eggs average 29·4×21·6 mm.: maxima **32·0**×23·2 and 29·5×**23·75** mm.; minima **26·0**×22·1 and 26·9×**20·0** mm.

Habits. Quite similar to those of the preceding race but this Woodpecker is more essentially a bird of the forest, seldom entering open country. Gyldenstolpe says that it is very common in the dry, deciduous forests of Northern Siam.

Picus chlorolophus.

Key to Subspecies.

A. Larger, wing always over 125 mm.
  a. Wing 142 mm. or under.
    a'. Lower throat and breast olive-green..... *P. c. chlorolophus*, p. 17.
    b'. Lower throat and breast darker brownish olive-green ..... *P. c. chlorolophoides*, p. 19.
  b. Wing 142 mm. or over..... *P. c. simlæ*, p. 18.

B. Smaller, wing 125 mm. or under ....
c. Brighter above, with a distinct bronze wash on the wings ..... *P. c. chlorigaster*, p. 19.
d. Darker above, with no bronze wash on the wings .. .. *P. c. wellsi*, p. 20.

(1346) Picus chlorolophus chlorolophus.

THE EASTERN HIMALAYAN SMALL YELLOW-NAPED WOODPECKER.

Picus chlorolophus Vieill., Nouv. Dict. d'Hist. Nat., xxvi, p. 78 (1818) (Bengal).
Gecinus chlorolophus. Blanf. & Oates, iii, p. 23.

Vernacular names. *Darja-gadaiya-buku-mebrang* (Cachari).

Description.—Male. Nasal plumes and a line above the lores black; forehead, supercilium to the nape and moustachial streak crimson, the latter mottled with dark brown and white; crown olive-green; occipital feathers edged with crimson, forming a broken band linking the ends of the supercilia; nuchal crest golden-yellow; upper plumage bright yellowish-green; quills brown, the first two generally showing indications of white notches on the outer web, the remainder maroon-red on the outer webs edged with green, the green increasing in extent until the inner secondaries are all of this colour; tail brownish-black with bronze-green edges to the central feathers; lores and a line above the moustachial streak white; ear-coverts pale brownish-green; chin and throat brown barred with whitish; breast olive-brown, the depth of the brown varying considerably; abdomen, flanks, under tail-coverts, axillaries and under wing-coverts barred brown and white, the white often suffused with yellowish or olive.

Colours of soft parts. Iris brick-red (females and young) to crimson; bill horny-yellowish, or pale plumbeous yellow, much darker on the culmen and tip; legs and feet dull green or plumbeous green.

Measurements. Total length about 275 mm.; wing 126 to 142 mm.; tail 74 to 94 mm.; tarsus about 22 to 23 mm.; culmen 21 to 28 mm.; females of this species average decidedly smaller than the males.

Female. The crimson is restricted to a short, broad line from behind the eye to the nape; otherwise as in the male.

Young birds are very dull, have *no* crimson on the head and have the lower parts barred olive-brown and white throughout.

Distribution. Sikkim, Bhutan, Assam, Cachar and Sylhet; Hill Tippera and Chittagong Hill Tracts in Eastern Bengal; Northern Chin and Kachin Hills; Northern Shan States and Yunnan.

Nidification. This little Woodpecker breeds in Assam from early April to the end of May, numerously up to 2,000 feet, less

frequently but still quite commonly up to 4,000 feet. It may be found nesting in almost any kind of country but particularly affects thin evergreen forest. I have found their tunnels not two feet from the ground and others between forty and sixty feet up in fairly thin boughs and quite inaccessible. They lay three or four eggs, occasionally five; thirty average 24·3 × 19·0 mm.: maxima 28·9 × 19·3 (*Mandelli*) and 25·6 × 19·6 mm.; minima 22·0 × 17·2 mm.

Habits. Very similar to those of *P. canus gyldenstolpei*, but unlike that bird it is often found in mixed bamboo- and scrub-jungle as well as in all sorts of forest. Its ordinary note also is a rather soft replica of that of the same bird but I have heard both male and female during the breeding-season uttering quite a different note, a low chuckling sound, rapidly repeated. The male utters it when pursuing the female, whilst the female at once takes it up if he stops his pursuit. The female, also, sometimes pursues the male and I once watched a pair in the dusk alternately pursuing one another and uttering this note until coition took place, when I shot the pair and to my astonishment found they were Woodpeckers.

It is a very bold bird at all times and very easy to watch, allowing a quiet approach to within a few feet.

(1347) Picus chlorolophus simlæ.

THE WESTERN HIMALAYAN SMALL YELLOW-NAPED WOODPECKER.

Picus chlorolophus simlæ Meinertz., Bull. B. O. C., xliv, p. 54 (1924) (Debra Doon).
Gecinus chlorolophus. Blanf. & Oates, iii, p. 23 (part).

Vernacular names. None recorded.

Description. Similar to *P. c. chlorolophus* but bigger. The nuchal crest is nearly always a paler yellow, more lemon less orange and the white notches on the outer primaries more conspicuous and extending to the third or fourth primary.

Colours of soft parts. The same as in all the races.

Measurements. Wing 142 to 150 mm.; Naini Tal birds seem rather small, as little as 138 mm. in some wing-measurements; culmen 23 to 27 mm.

Distribution. North-West Himalayas from Murree and Mussoorie to Garhwal.

Nidification. The only eggs I have seen of this Woodpecker were taken by Whymper at Naini Tal on the 23rd of April at about 5,000 feet. The nest-hole was bored in a "Banj" tree about 20 feet from the ground and contained four eggs, which measure 25·5 × 19·5 mm.

Habits. Those of the species. Jones and Dodsworth record it up to 7,000 feet in the Simla States but it is nowhere common.

(1348) Picus chlorolophus chlorolophoides.

THE BURMESE SMALL YELLOW-NAPED WOODPECKER.

Brachylophus chlorolophus chlorolophoides Gyldenstolpe, Orn. Monatsb., 1916, p. 28 (Koon Tan, N. Siam).
Gecinus chlorolophus. Blanf. & Oates, iii, p. 23 (part).

Vernacular names. None recorded.

Description. Differs from *P. c. chlorolophus* in being slightly darker above and decidedly darker, more brown and less olive, on the throat and breast.

Colours of soft parts. As in all the races.

Measurements. Wing 133 to 142 mm.; culmen 24 to 28 mm.

Distribution. All Burma from the South Chin and Kachin Hills, South Shan States to Tenasserim. Siam.

Nidification. Hopwood took four eggs of this race on the 3rd March from a nest-hole cut in a small tree in forest at about 3,000 feet in the Chindwin Hills. The entrance was about ten feet from the ground. Mackenzie took eggs in March.

Fifteen eggs average 24·3 × 18·0 mm.: maxima **25·5 × 19·0** mm.; minima **22·3 × 17·2** mm.

Habits. Those of the species. I cannot separate Meinertzhagen's *burmæ* from the Siamese birds and this name therefore becomes a synonym of *chlorolophoides*.

(1349) Picus chlorolophus chlorigaster.

THE SOUTHERN INDIAN SMALL YELLOW-NAPED WOODPECKER.

Picus chlorigaster Jerdon, Madr. Jour. L. S., xiii, pt. ii, p. 139 (1844) (South India).
Gecinus chlorogaster. Blanf. & Oates, iii, p. 25.

Vernacular names. *Pachcha koeralla* (Cing.).

Description. Differs from all the preceding races in being much darker green above; the breast is spotted with white, more or less, in all but the oldest birds; the extent of the crimson on the head is much greater in both sexes, whilst the nuchal yellow crest is less in extent and much paler.

Colours of soft parts. As in the other races.

Measurements. Wing 115 to 125 mm.; tail 68 to 80 mm.; tarsus about 22 to 23 mm.; culmen about 21 to 26 mm.

Distribution. Southern India as far North as Khandesh and North Kanara; throughout South-West India to the extreme South of Travancore. On the East coast of South India apparently only from Madras Southwards.

Nidification. This Woodpecker breeds in Kanara and Khandesh (*Davidson*) in April and May but in Travancore Stewart and

Bourdillon found nests with eggs from February to early May. The trees selected for building sites are generally in forest, but this may be either deciduous or evergreen. Like so many other southern races of birds the clutches of eggs are small, generally only two, less often three. Twelve eggs average 25·8 × 18·8 mm.: maxima **27·1** × 18·4 and 26·1 × **19·3** mm.: minima **24·8** × 18·3 and 25·8 × **17·8** mm.

Habits. This bird is found from the foothills to about 5,000 feet but is more common under 3,000 feet. It feeds both on living and fallen trees, its diet consisting of all kinds of insect food, coleoptera, larvæ, ants, etc. It is said to have a plaintive call which it utters when perched, as well as the usual chattering call of the family.

(1350) Picus chlorolophus wellsi.

THE CEYLON SMALL YELLOW-NAPED WOODPECKER.

Picus chlorolophus wellsi Meinertz., Bull. B. O. C., xliv, p. 56 (1924) (Ceylon, Cocawatte).
Gecinus chlorogaster. Blanf. & Oates, iii, p. 25 (part).

Vernacular names. None recorded.

Description. Similar to *P. c. chlorigaster* but darker above, with less or no bronze sheen on the wings and seldom any on the back.

Colours of soft parts. As in the other races. A. L. Butler records the legs as "sap green."

Measurements. Wing 115 to 125 mm.; culmen 21 to 25 mm.

Distribution. Ceylon up to 5,000 feet.

Nidification. Unknown.

Habits. According to Wait this race is confined almost entirely to the Southern half of Ceylon. It is found in the hills but apparently not up to any great height. Wait says that it is a shy bird, keeping to forests or to decayed gardens where there is plenty of underwood. Layard observed it on the ground breaking up dried cow-dung in search of the insects and beetles harbouring in it.

Picus puniceus.

Picus puniceus Horsf., Trans. Linn. Soc., xiii, p. 176 (1821).

Type-locality: **Java.**

The typical form from Java differs from that found in Tenasserim and the Malay Peninsula in having the sides of the head more dusky grey and the back less suffused with a yellow sheen. The differences are very slight and more and better material may show them to be merely individual.

(1351) Picus puniceus observandus.

THE MALAY CRIMSON-WINGED GREEN WOODPECKER.

Gecinus observandus Hartert, Novitates, iii, p. 542 (1896) (Sumatra).
Gecinus puniceus. Blanf. & Oates, iii, p. 26.

Vernacular names. None recorded.

Description.—Male. Nasal plumes and a line over the lores black; lores dark grey, grey-green or dull green; whole crown, anterior crest and sides of neck crimson; posterior crest bright yellow; back, scapulars, rump and upper tail-coverts grass-green, the feathers edged with a yellow sheen, covering nearly all the rump and upper tail-coverts; tail black or brownish-black; wing-coverts crimson; primaries dark brown, with a few dull white notches on the outer webs; base of outer web of first primary crimson, the colour increasing inwardly until the innermost primary has the outer web nearly all of this colour; secondaries crimson on the outer, green on the inner webs; sides of the head normally dull greyish-green but varying very greatly and in some practically chrome-yellow; a broad moustachial stripe crimson; chin and throat ochre-brown or ochre-green, darkening on fore-neck and breast to dull brownish-green or olive-green; posterior flanks barred and spotted with white; vent and under tail-coverts dull green.

Individual variation in this species is very great both on the upper and lower plumage.

Colours of soft parts. Iris crimson in the adult, grey in the young; lower mandible, gape and upper mandible greenish-grey, upper mandible black; legs and feet pale dull green.

Measurements. Wing 124 to 135 mm.; tail 79 to 90 mm.; tarsus about 22 mm.; culmen about 27 to 32 mm.

Female. Similar to the male but with no crimson moustachial stripe and, generally, duller and browner below.

Young birds have no crimson on the head and have the lower parts much browner and barred and spotted almost throughout with white.

Distribution. Tenasserim, Malay Peninsula, Sumatra and Borneo. South-West Siam.

Nidification. Unknown.

Habits. Davison says that this Woodpecker frequents evergreen forests, coming into the clearings. It has a curious habit of working its way to the top of a tree and sitting there uttering a curious plaintive call quite unlike a woodpecker's; it is especially noisy in the evenings, after other woodpeckers have ceased to call. It is said never to descend to the ground and to go about singly and not in pairs as most woodpeckers do.

Picus erythropygius.

Gecinus erythropygius Elliot, Nouv. Arch. du Mus., Bull. i, p. 76, pl. iii (1865).

Type-locality: Lower Cochin China.

The typical form differs from *P. e. nigrigenis* in having a white bill instead of a black one and in having less red on the head.

(1352) Picus erythropygius nigrigenis.

The Red-rumped Green Woodpecker.

Gecinus nigrigenis Hume, P. A. S. B., 1874, p. 106 (Pakchan, Tenasserim); Blanf. & Oates, iii, p. 26.

Vernacular names. None recorded.

Description.—Male. Crown crimson; forehead, supercilium, sides of the head, crest and nape black; back, scapulars, wing-coverts and inner secondaries bright yellowish grass-green, more yellow next the black nape and bronze-brown at the end of the inner secondaries; rump scarlet-crimson; upper tail-coverts like the back; tail blackish-brown; primaries blackish-brown with interrupted bars of white, absent on the outer webs of the first, or first and second primary; chin, throat, fore-neck and sides of neck bright yellow; breast more greenish-yellow, shading into dull white on the abdomen, flanks and under tail-coverts which are all profusely marked with dull black lines following the contours of the feathers.

Colours of soft parts. Iris lemon-yellow to bright yellow; bill horny-brown but varying greatly, in some males it is almost black, in some females the bill in the fresh skin is described as "greenish-yellow, culmen horny"; legs and feet dark, dull green.

Measurements. Wing 147 to 157 mm.; tail 99 to 114 mm.; tarsus about 30 to 31 mm.; culmen about 30 to 35 mm.

Female. Similar to the male but with no crimson crown, the cap being wholly black.

Distribution. From Karenni and Tounghoo, in Central East Burma, to Southern Tenasserim; peninsular Siam and part of Western Siam. Robinson and Kloss call all the Eastern Siam birds *P. e. erythropygius*, but in the dried skins the bills more nearly approach those of *P. e. nigrigenis*. One specimen from Mg Pai, Salwin, Siam, has a very black bill, even for *nigrigenis*, and must undoubtedly be placed with that race. Gyldenstolpe records it as common in Northern Siam.

Nidification. Two eggs sent me from Karenni were taken on the 7th February. They measure 28·0 × 20·8 and 27·8 × 19·8 mm. and are of the usual glossy white, very hard texture. Bingham took two very similar eggs on the 18th March from a nest-hole cut in a pynkado (*Xylia dolabriformis*) at about ten feet from the

ground. A tunnel about 1½″ wide and 10″ long had been cut out of the solid wood together with a chamber for the eggs.

Habits. This is said to be a very shy bird, frequenting open bamboo-jungle or clearings and associating in small parties. It does not ascend the hills to any height but keeps to the lower ranges, the foothills and broken ground in their vicinity. In Northern Siam Gyldenstolpe says that it keeps to the open deciduous forests. The call is described as singularly loud and far-reaching.

Genus CHRYSOPHLEGMA.

Chrysophlegma Gould, B. of A., vi, pl. xxxvi (1849).

Type, *Chrysophlegma flavinucha* Gould.

The genus *Chrysophlegma* differs from *Picus* in having the bill more curved and the nasal ridge almost obsolete. There is a well-developed nuchal crest and the prevailing colour of the upper parts is green. The sexes are dissimilar in the colour of the throat and chin.

Key to Species.

A. Upper surface of wings green ..... *C. flavinucha*, p. 23.
B. Upper surface of wings red ..... *C. mentalis*, p. 24.

(1353) Chrysophlegma flavinucha flavinucha.

The Large Yellow-naped Woodpecker.

Picus flavinucha Gould, P. Z. S., 1833, p. 120 (Himalayas).
Chrysophlegma flavinucha. Blanf. & Oates, iii, p. 28.

Vernacular names. *Mong-kli-ong* (Lepcha); *Daoja-ga-daiya* (Cachari).

Description.—Male. Whole upper part of head olive-brown, overlaid with dull rufous-maroon on all but the ear-coverts; nuchal crest golden-yellow to orange-yellow; whole upper plumage and closed wings, except primaries, glossy yellowish-green; primaries dark brown with broad bands of rufous; outer secondaries the same edged with green; tail brownish-black, the central tail-feathers edged with green near the base; chin and throat bright lemon-yellow; fore-neck rich brown, streaked with white; breast dark olive, gradually changing to paler olive-grey on the abdomen, posterior flanks and under tail-coverts.

Colours of soft parts. Iris crimson; bill pale plumbeous, sometimes more or less tinged with yellowish near the tip; legs and feet dull plumbeous or greenish-slate.

Measurements. Wing 160 to 175 mm.; tail 107 to 121 mm.; tarsus about 28 to 29 mm.; culmen 35 to 39 mm.

Female. Similar to the male, but has the chin, throat and lower cheeks rufous-brown instead of yellow.

Distribution. Himalayas from Mussoorie on the West to extreme East of Assam; Cachar, Manipur, Tippera and Chittagong Hill Tracts; all Burma South to about Moulmein; East to the Southern Shan States. In Siam it is replaced by *C. f. pierri*.

Nidification. This fine Woodpecker breeds throughout its range from the middle of March to the end of April; a few birds breed in May and I have taken a set of fresh eggs on the 2nd June. It is more common below 3,000 feet than above this height, but Whymper took its nest at about 5,000 feet near Naini Tal and it has been recorded as high as 6,000 feet in the Naga Hills. The nest-tunnel is nearly always made in very rotten trees and the entrance is seldom more than a few inches long. Most nests are between 10 and 15 feet from the ground and few above 20 or below 5 feet, whilst practically all are bored into the main trunk and not into branches. The birds usually lay three eggs, sometimes two only and sometimes four or very rarely five. Forty eggs average 28·8 × 22·2 mm.: maxima **31·5** × 24·0 and 29·0 × **24·4** mm.; minima **26·4** × 21·4 and 29·0 × **22·0** mm.

In this species, as in many other Woodpeckers, the male does far more of the incubation by day than does the female. The display of this bird is rather extraordinary. Like others of the family they probably pair for life but when the breeding-season approaches both sexes get very restless—even for Woodpeckers—and continually chase one another with a little squeaking cry; finally, sitting on some tree the female crouches close to the bark and the male then approaches her backwards, his head thrown right over his rump with beak held up and crest very widely expanded. After getting within a few inches of her he sidles across to the other side and repeats the same action, all the time the hen bird squeaking and shivering with excitement until, after a few repetitions of the male's display, the two eventually meet.

Habits. The Large Yellow-naped Woodpecker prefers jungle and forest which is not very dense, but shows no preference between deciduous dry forest and evergreen forest. It is not gregarious, but one seldom if ever sees one bird without the other being somewhere close by. Its cry is like that of the Black-naped Woodpeckers, but more noisy and raucous; it also has a subdued chuckling note, uttered by both sexes, when calling to one another.

Chrysophlegma mentalis.

Picus mentalis Temm., Pl. Col. 384 (1826).

Type-locality: Java.

The typical form is rather larger than our Indian, *humii*, and has the dark parts of the chin and throat black rather than dark brown. The female generally has the rufous supercilium less pronounced.

(1354) Chrysophlegma mentalis humii.

THE CHEQUERED-THROATED WOODPECKER.

Chrysophlegma humii Hargitt, Ibis, 1889, p. 231 (Malacca); Blanf. & Oates, iii, p. 28.

Vernacular names. None recorded.

Description.—Male. Top and sides of head dark olive-brown, the crown sometimes faintly tinged with rufous; crest bright yellow; back, scapulars, rump and innermost secondaries olive grass-green; tail brownish-black; wing-coverts and exposed parts of secondaries dull crimson; primaries black, broadly barred with rufous and the inner tinged with crimson on the outer webs; inner webs of secondaries black barred with rufous; cheeks, chin and throat dark brown, streaked and spotted with white; breast and sides of neck brick-red, this colour passing to the hind-neck below the crest; lower breast, flanks and under tail-coverts dull olive-green, tinged posteriorly with rufous-brown.

Colours of soft parts. Iris brick-red (? female) to crimson; bill black, paler and more plumbeous at the base and on the lower mandible; legs and feet dull green or plumbeous green.

Measurements. Wing 128 to 142 mm.; tail 86 to 90 mm.; tarsus about 24 mm.; culmen 30 to 34 mm.

Female. Like the male but with the cheeks, chin and sides of the throat immaculate brick-red.

Distribution. Tenasserim, Malay Peninsula, South-East Siam, Borneo and Sumatra.

Nidification unknown.

Habits. Practically nothing recorded. It is a bird of evergreen forests, and is generally seen singly and not in pairs, whilst its call is said to be very like that of the Black-naped Woodpeckers.

Genus CALLOLOPHUS.

Callolophus Salvad., Ucc. di Borneo, p. 50 (1874).

Type, *Callolophus miniatus* Forst. (By subsequent designation, Oates.)

The genus *Callolophus* has a long and broad occipital crest; the bill is shorter, more curved and broader at the base than that of *Chrysophlegma*. It also differs from that genus in being barred on both the upper and lower plumage.

Callolophus miniatus.

Picus miniatus Forst., Ind. Zool., p. 14, pl. iv (1781).

Type-locality: Java.

Our Indian form differs in having much less red on the upper plumage.

(1355) Callolophus miniatus malaccensis.

THE BANDED RED WOODPECKER.

Picus malaccensis Lath., Ind. Orn., i, p. 241 (1790) (Malacca).
Callolophus malaccensis. Blanf. & Oates, iii, p. 29.

Vernacular names. None recorded.

Description.—Male. Lores and nasal plumes brown; whole upper part of head and crest crimson, a few of the longest feathers of the anterior crown yellow; upper back and hind-neck dull olive barred with yellowish and, more or less, smeared with dull crimson; rump and lower back edged with bright lemon-yellow, this colour covering most of the rump; upper tail-coverts brown, with faint terminal buff spots; tail brownish-black; scapulars and exposed parts of wing-coverts dull crimson, the edge of the shoulder barred brown and buff; primaries brown, the second to the fifth notched on the outer web with buff and all with some bars of buff on the inner webs, the bases of the outer webs of all but the first two or three primaries crimson, gradually increasing until the whole of the outer webs and most of the inner webs of the secondaries are of this colour; sides of the head brown tipped with crimson or blackish-brown tipped with white, this speckled appearance sometimes extending round the eye; chin, throat and fore-neck brownish-rufous, sometimes stippled faintly with white and, in younger birds, with black; remaining underparts, axillaries and under tail-coverts waved with bars of dark brown and buff, the colours of the fore-neck and lower breast gradually grading into one another.

Colours of soft parts. Iris red to crimson; orbital skin plumbeous; upper mandible horny-black to black, lower mandible pale plumbeous or bluish horny; legs and feet dirty green or plumbeous green.

Measurements. Total length about 250 to 260 mm.; wing 121 to 127 mm.; tail 68 to 77 mm.; tarsus 22 to 23 mm.; culmen 23 to 25 mm.

Female. Sides of the head never crimson or rufous crimson but always blackish, speckled with white; chin and throat more profusely speckled and spotted with white and black.

Young birds are less barred above and have the bars below duller and less conspicuous, otherwise similar to the female.

Distribution. Tenasserim, South from Tavoy; peninsular Burma and Siam, Malay States, Sumatra and Borneo. Kloss separates the birds from peninsular Siam and Burma under the name *C. m. perlatus*. The differences appear to me to be individual and not geographical.

Nidification. Unknown.

Habits. According to Davison this species is found either in evergreen forest or in mangrove swamps, where it hunts for its

food on trees and never on the ground. Like the preceding bird it appears always to wander about singly, not in pairs. It has a similar call.

Genus GECINULUS.

Gecinulus Blyth, J. A. S. B., xiv, p. 192 (1845).

Type, *G. grantia* McClell.

The present genus has only three toes, the hallux, or inner posterior digit being wanting; the bill is short and compressed with the culmen blunt and nearly straight; the nostrils are close to the forehead and concealed by short nasal plumes; the tail-feathers are broad, but little acuminated and well graduated, the outer feathers slightly exceeding the upper tail-coverts in length; the crest is obsolete.

Key to Species.

A. Above dull crimson ..... *G. grantia*, p. 27.
B. Above green ..... *G. viridis*, p. 28.

(1356) Gecinulus grantia grantia.

THE PALE-HEADED WOODPECKER.

Picus grantia McClell., P. Z. S., 1839, p. 165 (Assam).
Gecinulus grantia. Blanf. & Oates, iii, p. 30.

Vernacular names. *Ka-ter* (Lepcha); *Koria* (Dafla).

Description.—Male. Forehead, round the eye and sides of the head pale golden olive-brown; sides of the neck, occiput and nape golden olive-yellow; a patch on the crown crimson-pink; upper plumage dull crimson-red; tail brown with basal bars of rufous and the outer webs more or less suffused with crimson; wing-quills brown, the primaries with broken bars of buff, the inner edged with crimson which increases inwardly until the inner secondaries are nearly all of this colour; chin and throat dull olive-yellow, sometimes tinged with ashy or rufous, gradually merging into dark brownish-olive on the rest of the lower parts; axillaries olive; under wing-coverts olive-brown with large white spots.

Colours of soft parts. Iris reddish-brown; upper mandible horny-blue, tipped paler, lower mandible darker on the basal half; legs and feet dull green.

Measurements. Total length about 250 to 260 mm.; wing 128 to 134 mm.; tail 79 to 86 mm.; tarsus about 23 to 24 mm.; culmen 24 to 27 mm.

Female. Similar to the male but the crown concolorous with the rest of the head. The colours of the soft parts are all much duller.

Young birds are like the female but dark brown on the mantle and very dark chocolate-brown on the breast, flanks and abdomen. A young male shot by me in Cachar has the feathers of the crown all tipped with crimson.

Distribution. Eastern Nepal and Sikkim to East and South Assam: Cachar, Sylhet and Manipur; Comilla and Chittagong in Eastern Bengal; Chin Hills in Burma. Robinson and Kloss record it from Annam. It has also been recorded from Laos in Siam, a specimen from this place being in the Paris Museum.

Nidification. This Woodpecker breeds in Assam in April and May, occasionally having a second brood in June and July. In Northern Burma it breeds from early March to April. The nest-hole is almost invariably bored in dead and rotten trees, such as stand in deserted cultivation over which a fairly thick secondary growth of scrub and bamboo has sprung up. The entrance to the nest is generally between five feet and twenty feet from the ground and never at any great height. The eggs seem always to number three and are of the usual description; twenty-four averaging 25·7 × 19·2 mm.: maxima **27·9** × 19·6 and 25·0 × **20·2** mm.; minima **22·0** × **17·8** mm.

Habits. The Pale-headed Woodpecker is resident between the foothills and 3,000 feet, wandering up some 1,000 feet higher and also some distance into the plains of Assam. It is found in almost any kind of forest or jungle but undoubtedly prefers mixed bamboo and scrub-jungle or the secondary growth found in deserted rice-fields. It is a shy, quiet bird for a Woodpecker; its call, a querulous, squeaking note, or succession of notes, being seldom uttered. It is nearly always found in pairs, though occasionally four or five are seen together when the young first leave the nest. It is seldom to be seen on the ground and, on the other hand, never frequents tall trees, hunting about most often below twenty feet or so and very commonly on fallen trees.

(1357) Gecinulus viridis.

THE SOUTHERN PALE-HEADED WOODPECKER.

Gecinulus viridis Blyth, J. A. S. B., xxxi, p. 41 (1862) (Pahpoon, Tenasserim): Blanf. & Oates, iii, p. 31.

Vernacular names. None recorded.

Description.—Male. Differs from *G. g. grantia* in having the whole crown and occipital crest crimson; the whole upper parts are golden olive-yellow, merely with traces of crimson on the rump and upper tail-coverts.

Colours of soft parts. Iris brown (*Davison*, ? females) to crimson; bill pale bluish-white, plumbeous or darker blue at the base; legs and feet dull greenish.

Measurements about the same as in *G. g. grantia*.

Female. Similar to the male, but with no crimson on the crown or crest, which is the same colour as the back but brighter and more yellow.

Distribution. Shan States, Central and South-West Siam; Central and South Burma to Kossum; Kloss has described the bird from the Malay States as *G. g. robinsoni*; two specimens in the British Museum confirm his diagnosis and a third specimen from South-East Siam is exactly like the two from the Malay States.

I have hitherto retained this Woodpecker as a race of *G. grantia*, principally because *G. g. viridanus*, an undoubted subspecies of *G. grantia*, shows much less crimson on the upper parts than does that bird, thus to some extent leading to *G. viridis*. The crests are, however, quite distinct and for the present therefore I give this bird the status of a species.

Nidification. Unknown.

Habits. Apparently very much the same as those of the preceding bird, though Davison never found it associating in small parties but always either in pairs or single.

Genus **HYPOPICUS**.

Hypopicus Bonaparte, Consp. Volucr. Zygod., No. 62 (1854).

Type, *Hypopicus hyperythrus* Vigors.

In the genus *Hypopicus* the bill is slender, compressed and truncated; the culmen is straight and angulate, with a short nasal ridge extending close down to the commissure for rather less than half the length of the bill; the nostrils are basal with short nasal plumes; the gonys is long, the chin angle close to the gape and concealed by bristles; the fourth toe (outer posterior) is slightly longer than the third (outer anterior); crest obsolete; outermost pair of tail-feathers shorter than the tail-coverts.

Only one species is known of which geographical races extend from the Western Himalayas to Northern China.

In 1912 Hartert showed that the forms from the Western and Eastern Himalayas differed and he then designated the type-locality of *H. hyperythrus* as *Darjeeling*, describing the North-Western bird as *marshalli*. The majority of Vigors's birds undoubtedly did come from the North-West Himalayas but it is equally certain that all did not come thence and that there were a few Eastern Himalayan birds among them. Under the circumstances it is quite possible that his type of *Hypopicus hyperythrus* came from Darjeeling so that Hartert's name cannot be discarded. Ticehurst's name for the Western form *sikkimensis* therefore becomes a synonym of *H. h. hyperythrus*.

Key to Subspecies.

A. Smaller, wing 115 to 127 mm. ..... *H. h. hyperythrus*, p. 30.
B. Larger, wing 126 to 136 mm. ..... *H. h. marshalli*, p. 31.

(1358) Hypopicus hyperythrus hyperythrus.

THE EASTERN RUFOUS-BELLIED WOODPECKER.

Picus hyperythrus Vigors, P. Z. S., 1831, p. 23 (Himalayas, Darjiling, *Hartert*).
Hypopicus hyperythrus. Blanf. & Oates, iii, p. 32.

Vernacular names. *Daoja-gadaiya ko-gajao* (Cachari).

Description.—Male. Lores and forehead white, edged with black; crown, nape, back and upper sides of neck crimson; back, scapulars and rump barred boldly black and white; upper tail-coverts black; tail black, the outer pairs barred with white on both webs and the third pair barred on the outer webs only; sides of head and chin black and white, a moustachial black stripe

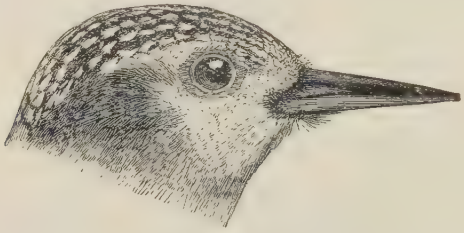

Fig. 5.—Head of *H. h. hyperythrus* ♀.

generally well defined; throat, sides of neck and lower plumage bright chestnut-rufous; posterior flanks barred with black and white; vent and under tail-coverts crimson; under wing-coverts black and white; axillaries white.

Colours of soft parts. Iris deep brown; bill black above, pale yellowish-horny to greyish-white below; legs and feet dull plumbeous.

Measurements. Wing 115 to 127 mm.; tail 73 to 80 mm.; tarsus about 20 to 21 mm.; culmen 23 to 26 mm.

Female. Has the whole crown and nape black spotted with white, otherwise like the male.

Young birds are like the females but are barred with dusky on the lower plumage.

Distribution. Nepal, Sikkim to Eastern Assam; Cachar, Sylhet; Tippera and Chittagong in Eastern Bengal, Manipur, Chin and Kachin Hills. Once in Siam near Lampong.

Nidification. This Rufous-bellied Woodpecker breeds during April and early May both in Burma and Assam, making its

nest-holes in rotten or semi-rotten trees and stumps at heights from the ground between 10 and 15 feet. Hopwood writing of birds from the Chin Hills says that these Woodpeckers often take as much as a month boring through the hard outer part of the tree into the inner rotten part and that the entrances differ from those of most woodpeckers in being oval rather than round. The eggs seem to number three in a full clutch, very rarely four or, equally rarely, two. Fifteen eggs average 22·2 × 16·5 mm.: maxima **25·0** × 16·0 and 24·5 × **17·2** mm.; minima **20·6** × 16·9 and 21·5 × **16·0** mm.

Habits. Over the greater part of its range this bird is common between 2,500 and 6,000 feet but in Sikkim it is found much higher and ranges up to 12,000 feet or more. Macdonald obtained it in the Chambi Valley at nearly 14,000 feet but Masson, on the other hand, found it below Darjeeling in May and June at about 7,000 feet. It keeps much to forest, to Pine in the higher ranges and to Pine and Rhododendron in the central ones. In N. Cachar I found it in Oak forest at 5,000 feet. It never associates in parties and is a quiet, shy bird, generally silent but with a loud querulous call, seldom indulged in. It feeds principally on trees between 20 and 40 feet from the ground.

(1359) **Hypopicus hyperythrus marshalli.**

THE WESTERN RUFOUS-BELLIED WOODPECKER.

Hypopicus hyperythrus marshalli Hartert, Vög. Pal., ii, p. 926 (1912) (Murree).
Hypopicus hyperythrus. Blanf. & Oates, iii, p. 32 (part).

Vernacular names. None recorded.

Description. Sex for sex similar to the preceding bird but larger. The male has the crimson on the sides of the neck and head more extensive.

Colours of soft parts as in the preceding bird.

Measurements. Wing 126 to 136 mm.; culmen 25 to 27 mm.

Distribution. North-West Himalayas from Kashmir, Kuman, Garhwal and Western Tibet.

Nidification. Eggs taken by Marshall and Rattray in the Murree Hills were laid in April and the first week in May in holes 20 to 40 feet from the ground. They breed from 5,000 feet to 10,000 feet and the eggs differ from those of the preceding race in being larger and, comparatively, broader. Twelve eggs average 24·3 × 18·2 mm.: maxima **25·1** × 19·7 and 25·0 × **20·0** mm.; minima **23·0** × **16·0** mm.

Habits. Similar to those of the last race though it is, perhaps, never found at such low elevations. It has been reported as a rare bird by most observers in the North-West Himalayas, but Ticehurst says that this is not the case. It keeps much to heavy forest.

Genus DRYOBATES.

Dryobates, Boie, Isis, 1826, p. 977.

Type, *Dryobates pubescens* Linn.

The genus *Dryobates* is very close to *Hypopicus* but differs in having a comparatively stouter bill with a nasal ridge extending over more than half its length and equally distant between culmen and commissure; the gonys is sharply angulate; the wing is rather long and pointed, the primaries exceeding the secondaries by about the length of the culmen.

Key to Species.

A. Middle tail-feathers all black.
  a. Back all black.
    a'. Lower parts not streaked.
      a''. Scapulars black.
        *a*³. Under tail-coverts crimson contrasting with grey or fulvous abdomen ..... *D. himalayensis*, p. 32.
        *b*³. Under tail-coverts and abdomen crimson ..... *D. cabanisi*, p. 34.
      b''. Scapulars white ..... *D. scindeanus*, p. 35.
    b'. Lower parts streaked.
      c''. Larger, wing over 120 mm..... *D. darjellensis*, p. 36.
      d''. Smaller, wing under 110 mm. .... *D. cathpariius*, p. 37.
  b. Back barred with white.
    c'. Crown and occiput crimson in male, black in female.
      e''. Wing under 113 mm. ..... *D. macei*, p. 39.
      f''. Wing over 113 mm..... *D. atratus*, p. 41.
    d'. Crown umber-brown; occiput crimson and yellow in male, dull yellow in female ..... *D. auriceps*, p. 42.
B. Central tail-feathers black barred with white ..... *D. analis* *, p. 43.

Dryobates himalayensis.

Key to Subspecies.

A. Darker below, more rufous or fulvous .. *D. h. himalayensis*, p. 32.
B. Paler below, more grey than fulvous.... *D. h. albescens*, p. 34.

(1360) Dryobates himalayensis himalayensis.

THE WESTERN HIMALAYAN PIED WOODPECKER.

Picus himalayensis Jard. & Selby, Ill. Orn., iii, pl. 116 (1835) (Mussuri).
Dendrocopus himalayensis. Blanf. & Oates, iii, p. 34.

Vernacular names. *Turkan* (Chamba).

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* The name *pectoralis* Blyth, J. A. S. B., xv, p. 15, 1846, cannot be used, as it is preoccupied by *Picus pectoralis* Wagler, Syst. Av., *Picus*, sp. 74, 1827. The next name available is *Picus analis* Bonaparte, Consp. Av., p. 137, 1850.

Description.—Male. Nasal plumes black; forehead white, more or less mottled with blackish and crimson and succeeded by a black line; crown, nape and shorter crest-feathers crimson; longest crest-feathers, hind-neck, back, rump, upper tail-coverts and four central tail-feathers black; outer tail-feathers banded fulvous-white and black, the white occupying most of the outer webs of the outermost feathers; inner median and greater coverts white, the former edged black; remaining wing-coverts black; quill-feathers black, barred with white on the outer webs and also on the inner webs of all but the innermost secondaries; lores, a narrow supercilium, cheeks and ear-coverts white; a broad moustachial streak black, extending on to the neck and encircling the ear-coverts; chin and throat fulvous-white, changing to darker fulvous on the breast, flanks and abdomen; under tail-coverts crimson.

Fig. 6.—Head of *D. h. himalayensis*.

Colours of soft parts. Iris brown or red-brown; upper mandible almost black, lower mandible plumbeous grey, blackish at the tip; legs and feet dull green or greenish-brown.

Measurements. Wing 123 to 135 mm.; tail 77 to 85 mm.; tarsus about 23 to 24 mm; culmen 29 to 33 mm.

Female. Similar to the male but with black crown and occiput.

Young birds are like the female but darker below and show signs of streaks or narrow dark edges to the feathers. The crimson crown when it first comes is tipped with black.

Distribution. Kuman, Simla States and Garhwal.

Nidification. This Woodpecker lays from early April to the latter part of May between 5,000 and 8,000 feet elevation, usually selecting an oak-tree in dense forest as a site for the nest. The eggs number three to five and are of the usual type, twenty averaging 26·2 × 19·0 mm.: maxima 27·7 × 20·0 and 25·7 × 20·3 mm.; minima 24·2 × 19·3 and 26·0 × 18·2 mm.

Habits. The Himalayan Pied Woodpecker is essentially a bird of thick forests, being seldom found in open land, however well

wooded. It has the usual habits of woodpeckers but keeps to trees and is not found frequenting the ground or low bushes. It is found down to 3,000 feet or even lower but does not seem to breed much below 5,000 feet.

(1361) Dryobates himalayensis albescens.

THE KASHMIR PIED WOODPECKER.

Dryobates himalayensis albescens Stuart Baker, Bull. B. O. C., xlvi, p. 70 (1926) (Gond, Kashmir)
Dendrocopus himalayensis. Blanf. & Oates, iii, p. 34 (part).

Vernacular names. None recorded.

Description. Sex for sex similar to *D. h. himalayensis* but much paler below; the chin, throat and breast are white or greyish-white and the whole lower surface is much less fulvous: the white bars on the tail seem generally broader and purer white.

Colours of soft parts. As in the preceding race.

Measurements. Wing 127 to 136 mm.; culmen 28 to 32 mm.

Distribution. Kashmir, Gilgit and North-East Afghanistan.

Nidification. Similar to that of the preceding race. The eggs are a little smaller and average longer in proportion. Twenty eggs average 26·2 × 19·0 mm.: maxima **28·1 × 19·8** mm.; minima **25·0 × 18·0** mm.

Habits. These differ in no way from those of the Western Himalayan Pied Woodpecker except that in some parts of Kashmir it is said to be found occasionally in orchards and comparatively open country. Like the last bird it is either solitary in its habits or accompanies its mate. Its voice is neither loud nor very harsh and seems to be infrequently uttered.

Dryobates cabanisi.

Picus cabanisi Malh., Jour. f. Orn., 1854, p. 172.

Type-locality: China.

The typical form differs from that found in Yunnan and the Shan States in being paler below, both the fulvous abdomen and the crimson under tail-coverts not being quite so deep a colour. This species is often united specifically with *D. major*.

(1362) Dryobates cabanisi stresemanni.

THE YUNNAN RED-CROWNED PIED WOODPECKER.

Dryobates major stresemanni Rensch, Alk. Ber. Tierk. Volk. die Dresden, xvi, p. 35 (1924) (Setchuan).
Dendrocopus cabanisi. Blanf. & Oates, iii, p. 35 (part).

Vernacular names. None recorded.

Description. Very similar to *D. h. himalayensis* but with the

forehead more broadly white; the crown black with only the occipital crest crimson; the crimson of the vent and under tail-coverts encroaches on the abdomen and in some specimens appears, like stains, on the breast.

Colours of soft parts. Iris crimson; upper mandible blackish lead-colour, lower mandible paler lead-colour; legs brownish-green.

Measurements. Wing 130 to 138 mm.; tail 79 to 87 mm.; tarsus about 20 to 21 mm.; culmen 26 to 31 mm.

Young birds are like the female but have the whole crown crimson and are much darker and browner below.

Distribution. Cachar, Manipur, Chin and Kachin Hills; Yunnan and Shan States to Western China.

Nidification. J. P. Cook found this Woodpecker breeding in the Kachin Hills at about 8,000 to 9,000 feet elevation during March and early April. Three hard-set eggs taken by him on the 3rd of April were laid in a nest-hole bored in "a rather small living tree about 8 feet from the ground standing in forest." They measure 28·8 × 18·7, 28·5 × 19·0 and 27·1 × 18·5 mm.

In Cachar and Manipur they breed in the same months between 5,000 and 8,000 feet but I have failed to find their nests.

Habits. So far as is known the Yunnan Pied Woodpecker only occurs very sparingly in the highest ranges of the Himalayas South of the Brahmaputra but is common in Yunnan, where Forrest found it between 8,000 and 13,000 feet both in pine-forests and evergreen, humid forests. On the few occasions on which I saw it in N. Cachar it was in rather thin oak-forest. It is a shy quiet little bird for a woodpecker and I never heard the note. The tapping on the trees is soft and very rapid with constant little stops.

I unfortunately described this bird as *D. c. stephensoni* in the Bull. B. O. C. xlvi, p. 70, 1926. Further material since received from Yunnan shows it to be the same as *D. c. stresemanni*.

(1363) Dryobates scindeanus.

THE SIND PIED WOODPECKER.

Picus scindeanus Horsf. & Moore, Cat. B. ii, p. 671 (1856–8) (Shikarpore, Sind).
Dendrocopus sindianus. Blanf. & Oates, iii, p. 36.

Vernacular names. None recorded.

Description. Sex for sex very like *D. h. albescens* but with the scapulars white instead of black; otherwise it is altogether a paler whiter bird; the broad white forehead, white cheeks and ear-coverts are purer and more extensively white than in the Himalayan forms; the underparts are decidedly paler and the crimson of the under tail-coverts extends on to the abdomen;

the white bars on the wings are wider and the bars on the tail are purer white.

Colours of soft parts. Iris brown to crimson; bill dark slaty-grey or bluish-plumbeous, paler on the lower mandible; legs and feet hoary grey to greyish-plumbeous.

Measurements. Wing 112 to 120 mm.; tail 67 to 73 mm.; tarsus about 20 mm.; culmen 22 to 25 mm.

Distribution. Sind, Baluchistan, Western Punjab to Peshawar; and North to South-East Persia.

Nidification. The Sind Pied Woodpecker lays in the latter half of March and in April, a few birds continuing into May. Over the greater part of Sind Bell found Tamarisk-trees on the borders of canals and rivers the favourite nesting sites, but Ticehurst says that around Karachi, where there is no Tamarisk, the Mango-tree takes its place. The tunnel may be anything from six to twelve inches long and the entrance, which is about one and a half inches across, is made low down, between three and twelve feet from the ground. The eggs number from two to four and the average of twelve is $22{\cdot}2 \times 17{\cdot}0$ mm.: maxima $23{\cdot}4 \times 17{\cdot}4$ mm.; minima $22{\cdot}0 \times 17{\cdot}1$ and $22{\cdot}5 \times 16{\cdot}4$ mm. The eggs are often much stained with brown.

The male bird seems to do most of the incubation by day.

Habits. This bird is common over the greater part of Sind where there is sufficient tree-growth, but is apparently rare elsewhere and does not occur in Cutch. It is not a noisy bird but gives notice of its whereabouts by a constantly uttered note which Bell syllabifies as "tr-r-r-r." Barnes found it common in Afghanistan breeding in April and May.

(1364) **Dryobates darjellensis.**

THE DARJEELING PIED WOODPECKER.

Picus darjellensis Blyth, J. A. S. B., xiv, p. 196 (1845) (Darjeeling).
Dendrocopus darjilensis. Blanf. & Oates, iii, p. 37.

Vernacular names. *Sadyer-mong-prek* (Lepcha).

Description.—Male. Upper parts like those of *D. c. stresemanni* but with the white forehead not so broad; the sides of the neck are fulvous, often tinged with pink and the white wing-spots are smaller; the chin, throat and sometimes the fore-neck are fulvous unstreaked; the breast, flanks and abdomen are yellowish-fulvous with a bold broad central streak to each feather; the centre of the abdomen is less boldly streaked but even more yellow.

Colours of soft parts. Iris red-brown (female) to deep crimson (adult male); orbital skin slaty-grey or plumbeous; upper mandible dark slaty-brown, almost black at the tip, paler bluish-slate at the base; lower mandible dark hörny-plumbeous at the tip shading to pale slaty at the base; legs and feet dull green or slaty-green.

Measurements. Wing 123 to 135 mm.; tail 77 to 86 mm.; tarsus about 22 to 23 mm.; culmen 32 to 35 mm.

Female. Is like the female of *D. c. stresemanni* but has the lower plumage streaked and coloured as in the male.

Young males have the crown crimson, otherwise young birds and nestlings, both male and female, are like the adult female.

Distribution. Nepal and Sikkim East to Eastern Assam, North and South of the Brahmaputra; Manipur, Chin and Kachin Hills, Shan States, Yunnan and Setchuan.

Nidification. The Darjeeling Pied Woodpecker breeds from 5,000 feet up to the highest peaks in South Assam and Northern Burma but in the Himalayas does not come below 6,000 feet. Stevens took several nests at elevations between 8,000 and 10,000 feet and Masson found it breeding at about 8,000 feet near Darjeeling. Twenty eggs average 27·8×19·6 mm.; the smallest egg in my collection is **26·5×19·0** mm.; the largest **29·0×19·9** mm.

Habits. This is a Woodpecker of high elevations. In Cachar and Manipur it is a rare resident at 5,000 feet upwards and I once found it breeding at this elevation. In Sikkim 6,000 feet is recorded as its lowest elevation by Stevens and he found it up to 12,000 feet; in Yunnan Forrest obtained it between 8,000 and 9,000 feet. It is a forest bird, frequenting both Pine and other forests but is particularly fond of Oak and Rhododendron trees. It apparently hunts in pairs, searching for food in the higher trees or in the upper parts of the smaller ones.

Dryobates cathparius.

Key to Subspecies.

A. Crimson on breast obsolete or absent . . . *D. c. cathparius*, p. 37.
B. Crimson on breast developed into a full gorget.
  a. Black surrounding gorget confined to narrow margin . . . . . *D. c. pyrrhothorax*, p. 38.
  b. Black surrounding gorget broad and extending on to centre of lower breast . . . . . *D. c. pernyi*, p. 39.

(1365) Dryobates cathparius cathparius.

The Himalayan Lesser Pied Woodpecker.

Picus cathparius Blyth, J. A. S. B., xii, p. 1006 (1843) (Darjiling).
Dendrocopus cathparius. Blanf. & Oates, iii, p. 37.

Vernacular names. None recorded.

Description.—Male. Upper parts similar to the same in the preceding bird but with the crimson of the occipital crest extending to the whole of the sides of the neck; the lower parts are also

similar to those of *D. darjellensis* but darker and more fulvous and the under tail-coverts are fulvous, streaked with black and always more or less tipped and edged with crimson; in most birds, especially males, there is an indication of a crimson breast-patch.

Colours of soft parts. Iris brown or red-brown; bill pale plumbeous, darker on the culmen and tip; legs and feet plumbeous or greenish-plumbeous.

Measurements. Wing 96 to 104 mm.; tail 55 to 61 mm.; tarsus about 15 mm.; culmen 15 to 17 mm.

Female. Like the male but with the whole crown and occiput black and the sides of the neck white or pale fulvous showing a certain amount of crimson staining.

Young males have the whole crown more or less crimson, though the black bases of the feathers show everywhere.

Distribution. Nepal, Sikkim, Bhutan and hills of Northern Assam.

Nidification. Hodgson records it as breeding in Nepal during April and May, Gammie took eggs below Darjeeling in April at about 4,000 feet and Masson twice took nests, in one case capturing the male bird, at about 7,000 feet near Darjeeling. The nest-holes are bored in dead or living trees standing in forest and generally at about twenty feet from the ground. The eggs vary from two to four and twelve average 23·3 × 16·8 mm.: maxima **25·0** × 17·4 and 24·4 × **17·7** mm.; minima **19·5** × **15·5** mm.

Habits. Quite similar to those of the preceding Woodpecker but it is found constantly at much lower elevations. It is most common between 4,000 and 7,000 feet, descending in Winter about a thousand feet lower. It must be quite exceptional above 8,000 feet.

(1366) Dryobates cathparius pyrrhothorax.

THE RED-BREASTED PIED WOODPECKER.

Picus pyrrhothorax Hume, Str. Feath., x, p. 150 (1887) (Aimole, E. Manipur).
Dendrocopus pyrrhothorax. Blanf. & Oates, iii, p. 38.

Vernacular names. *Khupi-woi-ru* (Angami Naga).

Description.—Male. Differs from the preceding bird in having a broad crimson gorget on the fore-neck and upper breast and in having the under tail-coverts nearly all crimson; the black striations on the underparts are also broader.

Colours of soft parts. Iris lac-red; bill leaden dusky, paler at the base of the lower mandible; legs and feet dull sap-green (*Hume*).

Measurements. Wing 97 to 101 mm.; tail 59 to 60 mm.; tarsus about 15 mm.; culmen 16 to 17 mm.

Female. Differs from that of *D. c. cathparius* in having more crimson on the upper breast and under tail-coverts.

Distribution. Khasia Hills, N. Cachar and Naga Hills, to Manipur.

Nidification unknown.

Habits. A very rare bird of which nothing is recorded. Apparently occurs in forest between 4,000 and 8,000 feet.

(1367) Dryobates cathparius pernyi.

THE KANSU RED-BREASTED WOODPECKER.

Picus pernyi Verreaux, Rev. et Mag. de Zool. 1867, p. 271 (Kansu).

Vernacular names. None recorded.

Description.—Male. Differs from *D. c. pyrrhothorax* in having the sides of the neck white as in *D. c. cathparius*; the black moustachial streak is very broad and extends as a broad band down the sides of the neck and completely surrounds the crimson breast-patch; on the lower breast and centre of the abdomen the black streaks coalesce, forming a conspicuous black patch.

Colours of soft parts. Iris brown or crimson; bill plumbeous; legs and feet greenish-brown.

Measurements. Wing 102 to 112 mm.; tail 63 to 72 mm.; tarsus about 15 mm.; culmen 18 to 19 mm. Shan States birds are very small, wings 98 to 101 mm., but they have the coloration of *D. c. pernyi* and the same big bill.

Female. Similar to *D. c. pyrrhothorax* but with much more black on the lower parts and no crimson wash on the white sides of the neck.

Distribution. Eastern Tibet, Kansu and Setchuan, Yunnan and Shan States, South to Na Noi.

Nidification. Not recorded.

Habits. This is a Woodpecker of high ranges from 6,000 feet up to 12,000 feet. In the South of the Shan States it seems to be found at lower elevations, occasionally down to 4,000 feet. It is a bird of dense forests.

(1368) Dryobates macei.

THE FULVOUS-BREASTED PIED WOODPECKER.

Picus macei Vieill., Nouv. Dict. d'Hist. Nat., xxvi, p. 80 (1818) (Bengal).
Dendrocopus macei. Blanf. & Oates, iii, p. 39.

Vernacular names. None recorded.

Description.—Male. Nasal plumes and forehead buffy-brown, the former tipped black; whole crown and shorter feathers of

crest crimson; longer feathers of sincipital crest black; hind-neck and extreme upper back black; tail-coverts black; remainder of upper parts broadly barred black and white; central two pair of tail-feathers black, third pair with a white spot, fourth pair with two or three white spots and two outer pairs barred black and white; lores, feathers round the eye, cheeks, ear-coverts and sides of neck buffy-white; chin, throat and fore-neck pale fulvous deepening on the upper breast; a black moustachial line produced back behind the ears; lower breast and flanks fulvous with faint mesial black streaks; posterior flanks, abdomen and vent barred dull dark brown and fulvous grey; under tail-coverts crimson; wing-feathers black; median coverts with white spots on the outer webs and greater coverts with white spots on both webs; all but the first primary with white spots on the outer webs and all quills with white spots on the inner webs, increasing in extent until the inner secondaries have practically complete white bars.

Colours of soft parts. Iris brown; bill plumbeous-slate darker on the culmen and tip, paler on the base and below; legs and feet dull greenish.

Measurements. Wing 100 to 112 mm.; tail 60 to 68 mm.; tarsus 17 to 18 mm.; culmen 21 to 24 mm.

Female. Differs from the male in having the crown and crest all black.

Distribution. Nepal, Sikkim, Assam North and South of the Brahmaputra, Eastern Bengal from Madhupur and Burdwan to Tippera and Chittagong, Manipur, probably only in the West. There is a single specimen from Akyab, South of Chittagong. West it is said to extend as far as Murree and Dodsworth obtained it in the Patiala State at 3,500 feet, but it is rare anywhere West of Nepal.

It is very difficult to decide whether *D. macei* and *D. atratus* should be treated as species or subspecies. Their differences appear to be only those of degree and speaking broadly the former is a Northern and Western form, whilst the latter is a Southern and Eastern form. At the same time there appear to be no intermediate forms which can be said to link the two together and *D. atratus* has a habit of cropping up outside its proper area rather frequently, whilst both forms are apparently common in Manipur. For the present, therefore, I retain these two birds as full species.

Nidification. The Fulvous-breasted Pied Woodpecker breeds from the level of the plains up to about 4,000 feet, generally, however, under 2,000 feet. It affects clearings in forests, thin forest or even well-wooded open country in selecting sites for its nest and seems almost invariably to choose small dead trees or rotten stumps in which to make its tunnel. One nest I found in a post of a cattle pound by a small village. The hole, so far as is recorded, seems always to be between four and six feet

from the ground and the eggs number three to five. Twenty-two eggs average 22·2 × 16·4 mm : maxima **23·3** × 16·6 and 23·0 × **17·2** mm.; minima **21·0** × 16·0 and 21·9 × **1·49** mm.

The breeding-season lasts from April, when most eggs are laid, until June or even July. The male bird is almost entirely responsible for the incubation by day but, probably, the hen bird sits all through the night. They are very close sitters and it is quite difficult to make the male leave the nest.

Habits. This little Woodpecker seems to prefer open or semi-open country in the plains and lower valleys running into the mountains. Stevens only found it up to 3,500 feet in Rungbong, Sikkim, whilst it is very common throughout the plains of Assam, especially near the hills. In Western India Hutton found it breeding up to 5,500 feet near Mussoorie and it occurs in Murree at still higher elevations. It is a quiet little bird with a curious squeaking voice, which distinguishes it easily from all except the next species of Woodpecker. It feeds very largely on ants and will take these on the ground as well as from trees and moss-covered boulders.

(1369) Dryobates atratus.

THE STRIPE-BREASTED PIED WOODPECKER.

Picus atratus Blyth, J. A. S. B., xviii, p. 803 (1849) (Tenasserim).
Dendrocopus atratus. Blanf. & Oates, iii, p. 40.

Vernacular names. None recorded.

Description. Differs sex for sex from *D. macei* in having the sides of the head and neck, chin, throat and fore-neck white and less fulvous than in that bird; the lower parts are streaked from the throat to the vent with bold black streaks and there are only faint indications of the barring on the flanks; in most birds the black band on the hind-neck and upper back is decidedly broader.

Colours of soft parts. Iris brown (female) to lac-red (male); bill greenish-horny, darker on the culmen and tip; legs and feet dusky leaden, dark plumbeous or plumbeous-green.

Measurements. Wing 114 to 122 mm.; tail 65 to 72 mm.; tarsus 18 to 19 mm.; culmen 24 to 26 mm.

Distribution. Khasia Hills, Cachar, Manipur and practically the whole of Burma, South to Tenasserim.

Nidification. This little Woodpecker breeds freely in the hills South of the Brahmaputra River from the level of the plains up to about 5,000 feet but is most common between 2,000 and 4,000 feet. It selects much the same sites as the preceding bird but seems especially fond of trees standing in cultivation patches, whether new or deserted. The eggs number four or five and like those of the Fulvous-breasted Woodpecker are of very strong,

glossy texture. Twenty-two eggs average 21·3×16·9 mm.: maxima **24·1×17·8** mm.; minima **19·0×14·3** mm. A larger series would almost certainly give bigger measurements as my series contains two clutches of exceptionally small eggs.

Habits. Only differs from the preceding bird in frequenting rather higher elevations over most of its habitat.

(1370) Dryobates auriceps.

THE BROWN-FRONTED PIED WOODPECKER.

Picus auriceps Vigors, P.Z.S., 1831, p. 44 (published April 6th, 1831) (Simla).
Dendrocopus auriceps. Blanf. & Oates, iii, p. 40.

Vernacular names. None recorded.

Description.—Male. Forehead and fore-crown umber-brown shading into golden-brown on the hinder crown and then into golden-yellow and crimson on the crest; lores and feathers behind the eye pure white; cheeks and ear-coverts whity-brown; below the ear-coverts and sides of neck white streaked with black; hind-neck velvety-black; upper back brownish-black; remaining upper parts, wings and tail as in *D. macei*; a broad brown moustachial streak turning to black on the sides of the neck; chin and throat white, almost immaculate; fore-neck and upper breast white changing to pale golden fulvous on the abdomen and posterior flanks, the whole of these parts from neck to vent boldly striped with black; under tail-coverts, vent and sometimes the centre of the abdomen crimson-pink; axillaries white; under wing-coverts white spotted with black.

Colours of soft parts. Iris brown (female) to crimson (adult male); bill bluish-horny, the culmen darker and the base of the lower mandible paler; legs and feet "pale glaucous green" (*Davison*) to dull grey-green.

Measurements. Wing 112 to 118 mm.; tail 68 to 73 mm.; tarsus 18 to 20 mm.; culmen 21 to 24 mm.

Female. Is like the male but has no gold or crimson on the head.

Young birds are like the female but duller below and have the crown umber-brown, each feather centred with yellow; below they are duller and more grey.

Distribution. North-West Himalayas, from the Afghan and Baluchistan boundary to South Kashmir, Garhwal and Nepal.

Nidification. The Brown-fronted Woodpecker breeds throughout its range between 2,000 and 6,000 feet and both Dodsworth and A. E. Jones have taken its eggs round about Simla up to 7,500 feet. According to the former collector it breeds equally freely in any kind of forest, Oak, mixed, Deodar or Fir, making its nest-hole at greatly varying heights from the ground. Hume

records nest-holes as high as 40 feet from the ground but the majority are perhaps under 20 feet. Most eggs are laid during April, a few in the last week in March and others up to the end of May. The full clutch is four, less often five, and fifty eggs average 23·4 × 17·4 mm.: maxima **26·1** × 17·2 and 24·0 × **18·2** mm.; minima **20·0** × **15·3** mm.

Habits. This Woodpecker is a frequenter of forests, both the interior and the outskirts, but is also found in well-wooded open country and even in gardens and orchards. It is said sometimes to do considerable damage to pears and other fruit, though probably this is done by getting at the grubs inside and not in eating the fruit itself. The call is a typical Woodpecker's but soft and rather pleasant.

Dryobates analis.

The name *Picus pectoralis* Blyth, J. A. S. B., xv, p. 15, 1846, is preoccupied by Wagler, Syst. Av. 1827, Picus sp. 74. The next name available is *Picus analis* Bonaparte, nec Temm.

Key to Subspecies.

A. Paler below; spots on breast fewer and smaller ..... *D. a. analis*, p. 43.
B. Intermediate below; spots on breast rounder and larger ..... *D. a. longipennis*, p. 44.
C. Darker below; spots on breast darker and more numerous ..... *D. a. andamanensis*, p. 45.

(1371) Dryobates analis analis.

THE SPOTTED-BREASTED PIED WOODPECKER.

Picus analis Bonaparte, Consp. Av., p. 137 (1850) (Java).
Dendrocopus pectoralis. Blanf. & Oates, iii, p. 41.

Vernacular names. None recorded.

Description.—Male. Lores and a narrow line on forehead buffy-brown, the nasal plumes tipped with black; a broad white supercilium from over the eye; crown crimson; nape and hind-neck black; whole upper plumage and tail barred black and white; wing-coverts black with broad white bars; quills dark brown spotted with white, the spots increasing to bars, broken by the shafts, on the innermost secondaries; cheeks and ear-coverts pale brown; sides of neck white; chin and throat fulvous-white, or nearly white; a moustachial streak black, broadening on the neck; breast and abdomen dull fulvous, darkest and rather brown on the former; breast spotted with blackish, the abdomen with faint brownish streaks and the posterior flanks barred a little more definitely; vent and under tail-coverts pale dull pink, more or less spotted with dark

brown; axillaries and under wing-coverts white spotted with black.

Colours of soft parts. Iris brown; bill bluish-black, paler at the base; legs and feet plumbeous (*Oates*).

Measurements. Wing 94 to 101 mm.; tail 49 to 52 mm.; tarsus about 17 to 18 mm.; culmen 19 to 22 mm.

Female. Similar to the male but with the crown black.

Young birds are like the female but duller and darker below.

Distribution. Java, Sumatra, Malay Peninsula and Central Burma as far North as Tounghoo. The Siam and Indo-Chinese birds seem to be easily separable and some of the Karenni birds approach them but, on the whole, are nearer the Javan form.

Nidification. Eggs from the Waterstradt Collection taken in Java were laid in May and June. In size they vary between 21·4×15·1 mm. and 23·5×17·7 mm.

Habits. This little Woodpecker appears to be a bird of the lower hills and plains, not ascending the hills to any height. It is not a forest bird, frequenting well-wooded cultivated country, bamboo and scrub jungle and sometimes the outskirts of thin deciduous forest. It has not been observed feeding on the ground.

(1372) **Dryobates analis longipennis.**

THE SIAMESE PIED WOODPECKER.

Dendrocopus analis longipennis Hesse, Ornith. Monatsb., 1912, p. 82 (Bangkok, Siam).

Vernacular names. None recorded.

Description. Differs, sex for sex, from *D. a. analis* in having bolder, rounder spots on the breast; slightly less fulvous underparts; whiter chin and throat and decidedly whiter ear-coverts and sides to the head; the malar black streak is also generally wider and more developed.

Colours of soft parts. As in the preceding bird.

Measurements. The same as in *D. a. analis*.

Distribution. Siam, Annam and Cochin China; birds from Karenni somewhat approach this form and a young bird from Pyawbwe, Upper Burma, seems to be identical with one from Siam.

Nidification. Herbert found this Woodpecker breeding in some numbers round about Bangkok in December, January and February and took numerous nests. The eggs number two to four and thirty of them average 21·2×15·8 mm.: maxima **22·3**×16·0 and 22·1×**16·8** mm.; minima **19·2**×15·5 and 19·9×**14·6** mm.

Herbert writes: "The nesting-hole is generally made in the stem of a Betel palm which has not long been dead, or, sometimes, in a dead coconut palm and is situated at a height of twenty to thirty feet from the ground. The usual neat little hole is

cut in the hard surface of the palm and the soft fibrous interior is excavated to a depth of about six inches. On two occasions the bird was taken on the nest and in each case it was the male."

Habits. Those of the preceding race. It seems to avoid forest or heavy jungle of any kind and Herbert found it common in the Bansukai fruit gardens and coconut grooves.

(1373) Dryobates analis andamanensis.

THE ANDAMAN PIED WOODPECKER.

Picus andamanensis Blyth, J. A. S. B., xxviii, p. 412 (1859) (Andamans).
Dendrocopus andamanensis. Blanf. & Oates, iii, p. 42.

Vernacular names. None recorded.

Description.—Male. Differs from *D. a. analis* in having the bases of the feathers of the head grey, not black; the breast and fore-neck are more profusely marked with blolder, rounder black spots whilst the lower breast and abdomen are much darker and more rufous; the chin and throat are whiter and often a little spotted with black; the malar band is less broad and is broken near the chin; the under tail-coverts are a deeper crimson.

Colours of soft parts. Iris dark brown; bill dark slate-colour, darkest on the culmen, paler on the lower mandible; legs and feet dark olive-green.

Measurements. As in *D. a. analis* but with a longer tail, 55 to 60 mm., and shorter culmen, 17 to 20 mm.

Female. Differs from the female of *D. a. analis* in having the crown deep brown rather than blackish.

Distribution. Andamans only.

Nidification. Osmaston and Wickham found this bird breeding freely in the Andamans round about Port Blair. The majority of nest-holes were bored on the underside of branches of avenue trees, chiefly the Rain-Tree, *Pithecolobium saman.* They breed from January to March and lay one or two eggs only, very rarely three. Thirty eggs average 21·2 × 16·3 mm.: maxima 22·4 × 15·9 and 21·6 × 16·8 mm.; minima 20·0 × 14·9 mm.

Habits. Those of the species. Most common in thin open jungle and round about cultivation.

Genus LEIOPICUS.

Leiopicus Bonaparte, Consp. Volucr. Zygod., No. 65 (1854).

Type, *Leiopicus mahrattensis* Lath.

The genus *Leiopicus* differs from *Dryobates* in having a more rounded wing, the primaries exceeding the secondaries by less than the length of the culmen. It has a small crest.

Leiopicus mahrattensis.

Key to Subspecies.

A. Darker; above more black, less white; below darker brown with deeper crimson ..... *L. m. mahrattensis*, p. 46.
B. Less dark; above white more extensive; below less brown, crimson paler ..... *L. m. blanfordi*, p. 47.

(1374) Leiopicus mahrattensis mahrattensis.

The Southern Yellow-fronted Pied Woodpecker.

Picus mahrattensis Lath., Ind. Orn. Supp., p. xxxi (1801) (India, restricted to Belgaum in the "Mahratta" country).
Liopicus mahrattensis. Blanf. & Oates, iii, p. 43.

Vernacular names. None recorded.

Description.—Male. Lores, forehead and fore-crown pale golden-brown, shading into scarlet-crimson on the hinder crown and crest; a white line over the pale brown ear-coverts; nape and hind-neck blackish-brown; back and scapulars mottled black and white; rump white with concealed black bases; upper tail-coverts white with black centres; tail black with broken bars and spots, white above, fulvous below; wing-coverts black with large white terminal spots; wing-quills brownish-black, spotted with white, this increasing until on the innermost secondaries they become broken bars; chin, throat and cheeks white; fore-neck white streaked with dark brown; a broad brown stripe down the sides of the neck, sometimes almost meeting on the breast; remaining underparts white, very profusely streaked with brown, the centre of the abdomen and vent scarlet-crimson.

Colours of soft parts. Iris blood-red to deep red; bill bluish-plumbeous, dark horny-brown on the culmen and tip; legs and feet rather bright bluish-slate.

Measurements. Wing 94 to 101 mm.; tail 48 to 56 mm.; tarsus 18 to 19 mm.; culmen 23 to 25 mm.

Female. Like the male but with the whole crown and crest pale golden-brown.

Young birds are like the female but are darker, duller and more profusely striped below.

Distribution. Ceylon, South India about as far North as Poona, on the West, the Deccan, Berar in Central India, Bustar and the Northern Circars. A few specimens from Manbhum in W. Bengal are also very near this race.

Nidification. The Southern Yellow-fronted Woodpecker breeds principally from January to March but in Ceylon Wait found it breeding in May and again in July, generally selecting Euphorbias in which to make its nest-hole. In India it seems to bore them in almost any kind of tree, but Babools and Acacias are the

favourites. It selects trees which are to some extent rotten internally, boring through the sound outer part of the trunk or branch and then excavating the rather larger egg-chamber in the decayed portion. The eggs number two to four, generally three and are of the usual type. Twenty eggs average 22·2 × 16·4 mm.: maxima (my own collection only) **23·2 × 16·0** and 22·5 × **17·2** mm.; minima **19·6 × 15·3** mm.

Habits. This Woodpecker frequents either quite thin forest or open cultivated country if fairly well wooded. It is most partial to thin bush and small tree-jungle or to mixed bamboo and scrub, often also entering and even breeding in gardens and orchards. Its call is a weak trill and the sound of its tapping is also rather weak and soft. Its food, very largely ants, is sought for low down in trees and bushes but not on the ground. It ascends the hills of Southern India up to about 2,500 feet and possibly a little higher.

(1375) Leiopicus mahrattensis blanfordi.

The Northern Yellow-fronted Pied Woodpecker.

Picus blanfordi Blyth, J. A. S. B., xxxii, p. 75 (1863) (Burma, restricted to Tounghoo).
Liopicus mahrattensis. Blanf. & Oates, iii, p. 43 (part).

Vernacular names. None recorded.

Description. Sex for sex similar to the preceding bird but having the white more extensive; the dark parts browner and less black and the crimson of crown and abdomen rather less deep.

Colours of soft parts as in the Southern form.

Measurements. Wing 99 to 105 mm.; tail 52 to 62 mm.; tarsus about 18 to 20 mm.; culmen 23 to 25 mm.

Distribution. India North of the area occupied by the preceding race; Bihar, Assam where it is rare; Cachar and Sylhet, equally rare; Burma, South to Tounghoo and East to the Shan States and Cochin China.

Nidification. Throughout its range this Pied Woodpecker breeds in the plains and commonly up to about 2,500 feet in the Himalayas whilst, exceptionally, its eggs have been taken nearly up to 5,000 feet. Over Northern India, the tree selected is usually one in more or less open country and the entrance to the tunnel is made more often under twenty feet from the ground than over. The breeding months are February to April or early May in the higher ranges, whilst on one occasion I took hard-set eggs in North Cachar on the 10th August from a hole in a tree well over thirty feet from the ground. The eggs number two to four, once five, and are like those of the family. Twenty-five eggs average 21·3 × 16·4 mm.: maxima **24·2 × 16·0** and 21·2 × **17·4** mm.; minima **19·5 × 16·0** and 20·3 × **15·2** mm.

The period of incubation appears to be 13 days, an egg laid n the 14th of April being hatched on the 27th.

Habits. This Woodpecker, like the other races, is a bird of comparatively open country and thin forest, but in the North and East of its range is sometimes to be seen on the outskirts of heavy, evergreen forest. It is an active little bird, climbing with great rapidity and ease. Its flight is quite typical but the dips less accentuated and shorter than they are in most Woodpeckers.

Genus YUNGIPICUS.

Yungipicus Bonaparte, Consp. Volucr. Zygod., No. 67 (1854).

Type, *Yungipicus hardwickii* Jerdon.

The genus *Yungipicus* is very close to *Dryobates*, containing a group of small Woodpeckers which differ from those of the latter genus in having a more pointed wing in which the primaries exceed the secondaries by considerably more than the length of the tarsus; the first primary is small and the second reaches nearly to the end of the wing, the third, fourth and fifth being longest and subequal. The tail is shorter, comparatively, than in *Dryobates*.

I retain the whole of the birds found within the limits of this work in the one species *hardwickii*. The principal differences between the various geographical forms are (*a*) the amount of scarlet on the head; (*b*) the presence or absence of bars on the upper tail-coverts; (*c*) the striations on the lower plumage and (*d*) the colour of the crown. I find that in every one of these respects there is a certain amount of intergradation and that each form has a well-defined breeding area into which the other forms do not encroach; the value of the differentiating characters does not therefore seem to be more than subspecific.

As *hardwickii*, 1844, is the oldest name it will be the specific one, *pygmæus*, 1831, being unfortunately preoccupied.

Yungipicus nanus of Vigors, said to have been found in the North-West Himalayas, appears to be a Malayan bird (*Y. h. suffusus* Robinson & Kloss) with a well-marked moustachial streak, not present in any Indian form.

Yungipicus hardwickii.

Key to Subspecies.

A. Upper tail-coverts barred black and white.
  a. Lower plumage plainly streaked.
    a'. Crown brown.
      a''. Much darker, crown dark brown .. *Y. h. hardwickii*, p. 52.
      b''. Much paler, crown pale brown .... *Y. h. brunneiceps*, p. 53.
    b'. Crown ashy-grey ..... *Y. h. canicapillus*, p. 51.
  b. Lower plumage either unstreaked or very faintly so ..... *Y. h. gymnopthalmos* [p. 54.

B. Upper tail-coverts black. [p. 49.
c. Occiput in males wholly red ..... *Y. h. semicoronatus*,
d. Red on occiput confined to a streak on either side.
c'. Lighter below; streaks brown, not black ..... *Y. h. mitchellii*, p. 50.
d'. Darker below; streaks much blacker. *Y. h. omissus*, p. 51.

(1376) Yungipicus hardwickii semicoronatus.

THE DARJEELING PIGMY WOODPECKER.

Picus semicoronatus Malherbe, Bull. Soc. d'Hist. Nat. Moselle, v, p. 21 (1848) (Himalayas, Darjeeling).
Iyngipicus semicoronatus. Blanf. & Oates, iii, p. 45 (part).

Vernacular names. *Daoja-gadaia mébérang* (Cachari).

Description.—Male. Forehead and crown ashy-brown; occipital short crest scarlet surrounded with black; nape and centre of hind-neck black; upper back black; back, rump, scapulars and wings black with broad white bars; upper tail-coverts and four central rectrices black; the next pair edged with whitish and sometimes showing signs of bars on the outer webs; outer pairs with the bars well developed; a broad white, or fulvous-white, supercilium from behind the eye widening and covering the sides of the neck; lores, cheeks and ear-coverts white or fulvous-white, mottled with darker fulvous and with a broad brown streak from under the eye to the base of the neck where it becomes black; chin and throat whitish streaked with ashy and with an ashy moustachial streak on either side; remainder of lower parts light fulvous-brown, streaked with black; axillaries and under wing-coverts black and white.

Colours of soft parts. Iris red or red-brown; bill plumbeous brown, generally darkest on the culmen; legs and feet brown (*Jerdon*) or greenish-brown.

Measurements. Total length about 160 mm.; wing 82 to 90 mm.; tail 41 to 45 mm.; tarsus about 14 to 15 mm.; culmen about 15 to 16 mm.

Female. Like the male but the red replaced by black.

Young birds are like the female but duller and browner.

Distribution. Himalayas from Sikkim to Eastern Assam. Birds from North Assam and from the North Naga Hills and Khasia Hills are generally typical *semicoronatus* but show in some cases traces of transition to *canicapillus*. In Cachar, Sylhet and Manipur birds are somewhat intermediate but on the whole nearer *canicapillus*, whilst many individuals are quite typical of this race.

Nidification. This quaint little Woodpecker breeds between 2,000 and 5,000 feet, possibly lower still, during the months of March and April. The tree selected is generally one standing

in thin deciduous forest, the outskirts of heavier forest or quite in the open, never I believe inside very dense forest. As a rule the entrance is between 20 and 30 feet from the ground, occasionally much lower; it is very small, something between $1\frac{1}{4}$ and $1\frac{1}{2}$ inches and rarely runs any depth into the branch unless it is very rotten. Most often living or fairly sound branches are selected and then the tunnel is only a few inches long, ending in a small chamber about 4 inches or less in width. The eggs number three to five and are of the usual character but broad and obtuse for Woodpeckers' eggs. Thirty average 18·6 × 14·4 mm.: maxima **20·8** × 15·0 and 18·8 × **15·3** mm.; minima **17·6** × 14·9 and 18·3 × **14·1** mm.

Habits. This bird frequents either the outskirts of pine and other forests or more open country so long as there is ample tree-growth. It is not partial to scrub or bamboo jungle but haunts the largest trees, where for the most part it keeps to the highest branches. It is a sociable little bird, the two birds of a pair always keeping together and often two pairs feeding in company. It is extremely active and quick in its movements, reminding one more of Nuthatches than the larger Woodpeckers, though it cannot run backwards and downwards like the former. The note is a typical woodpecker's though very soft and low and it also gives forth a curious little "*chip chip*" as the pairs move apart. The flight is similar to that of other Woodpeckers, but quick for its size and rather less dipping than usual; it also flies about a good deal from branch to branch when feeding, a trait not common in this family. In Winter this little Woodpecker occurs in the plains of Assam and also along the foot of the Sikkim and Bhutan Terai but in the breeding-season returns to the hills, generally above 2,000 feet, though Stevens records it as low as 1,100 feet in the Tista Valley.

(1377) Yungipicus hardwickii mitchellii.

THE KUMAN PIGMY WOODPECKER.

Picus mitchellii Malherbe, Rev. et Mag. Zool., 1849, p. 531 (Nepal).
Iyngipicus pygmæus. Blanf. & Oates, iii, p. 45.

Vernacular names. None recorded.

Description.—Male. Differs from the preceding race in having the scarlet on the head restricted to a narrow streak on either side of the crown from above the eye to the occiput; the black of the upper back is more restricted and, in most cases, the white bars to the upper back are broader and the black bars narrower; exceptionally there is a white speck or two on the upper tail-coverts or central tail-feathers.

Colours of soft parts. As in *Y. h. semicoronatus.*

Measurements. Wing 85 to 93 mm.; tail 42 to 46 mm.; tarsus about 16 mm.; culmen 14 to 15 mm.

YUNGIPICUS H. CANICAPILLUS ♂ 4/5.
The Burmese Pigmy Woodpecker.

Female and Young. Not distinguishable from those of the preceding bird.

Distribution. Nepal, Garhwal, Kuman to Mussoorie.

Nidification. Nothing recorded.

Habits. Apparently much the same as those of the preceding race but sometimes frequents deeper forest and never, so far as is recorded, visits the plains in Winter.

(1378) Yungipicus hardwickii omissus.

THE YUNNAN PIGMY WOODPECKER.

Dryobates pygmæus omissus Roths., Bull. B. O. C., xliii, p. 10 (1922) (Lichiang Range, Yunnan).
Iyngipicus pygmæus. Blanf. & Oates, iii, p. 45 (part).

Vernacular names. None recorded.

Description. Differs, sex for sex, from the preceding bird in being darker below with broader, blacker streaks. It is also decidedly larger.

Colours of soft parts. Iris brown; bill dark grey to black; legs and feet grey-green to blackish-grey (*Forrest*).

Measurements. Wing 92 to 102 mm.; tail 48 to 58 mm.; tarsus about 16 mm.; culmen 15 to 16 mm.

Distribution. North Yunnan and Kauri Kachin Hills. Among the many specimens of *Y. h. canicapillus* from the South Shan States collected by Rippon there is one quite typical specimen of the present race.

Nidification. Not known.

Habits. Forrest obtained numerous specimens of this Woodpecker in Yunnan, frequenting thickets at 6,000 to 7,000 feet in March and October and in Pine-forests at 10,000 feet in June and July.

(1379) Yungipicus hardwickii canicapillus.

THE BURMESE PIGMY WOODPECKER.

Picus canicapillus Blyth, J. A. S. B., xiv, p. 197 (1845) (Arrakan).
Iyngipicus canicapillus. Blanf. & Oates, iii, p. 46.

Vernacular names. *Daoja-gadaia kashiba, Daoja-gadaia mebe-rang* (Cachari).

Description.—Male. Very like *Y. h. mitchellii* but with the upper tail-coverts barred black and white and the central tail-feathers also marked with white; the crown is grey or ashy-grey as in that race and not brown as in the other Indian forms.

Colours of soft parts. Iris brown to red; bill dark plumbeous, blackish on the culmen; legs and feet plumbeous or plumbeous brown.

Measurements. Wing 81 to 91 mm.; tail 41 to 45 mm.; tarsus about 16 mm.; culmen about 14 to 16 mm.

Female. Similar to the male but with no red on the head.

Distribution. Cachar, Manipur, Hill Tippera and Chittagong Hill Tracts in Eastern Bengal; throughout Burma from the Chin Hills and Southern Shan States to Tenasserim and Peninsular Siam. The Malay form has been separated by Robinson and Kloss as *Y. h. suffusus* and the present race does not occur in the Kachin Hills or Northern Shan States. Birds from the more dry parts of Central Burma are rather more brown and less black, but there is so much overlapping that I refrain from naming them. Robinson and Kloss also record this form from Annam.

Nidification. This Pigmy Woodpecker breeds commonly in North Cachar and Manipur from the foothills up to about 3,000 feet. Its nest-holes are, however, very hard to find as they select very lofty trees and make the entrance holes in places where they are difficult to detect. They commence boring operations in late February and the first eggs are laid early in March, more being laid in the end of that month and many in April. All the nests I have seen have been made in trees either standing well out in the open or, more rarely, just on the fringe of heavy evergreen forest. Three to five eggs are laid of the usual type and twenty-four average 18·6 × 14·5 mm.: maxima **19·2** × 14·3 and 18·9 × **15·3** mm.; minima **17·7** × 14·4 and 18·8 × **14·2** mm.

Habits. Exactly the same as those of *Y. h. semicoronatus*, but it breeds at lower elevations and wanders farther and more often into the plains during the Winter months. The cock bird when pursuing the hen utters a curious squeaking noise which is taken up by the female as soon as he stops the pursuit.

(1380) Yungipicus hardwickii hardwickii.

THE SOUTHERN INDIAN PIGMY WOODPECKER.

Picus hardwickii Jerdon, Madr. Journ. Lit. Sci., xiii, p. 138 (1844) (Wynaad).
Iyngipicus hardwickii. Blanf. & Oates, iii, p. 47.

Vernacular names. *Chitta suruti pachi* (Tel.).

Description. Similar to *Y. h. canicapillus* but the crown deep umber-brown with no black on the sides; the upper plumage is barred dark brown and white instead of black and white and the under surface is duller with the streaks brownish and rather blurred in appearance; the feathers of the chin and throat have black bases which show through and the line from the eye is dark umber, embracing the whole of the ear-coverts. This is the smallest race of this species.

Colours of soft parts. Iris pale yellow; orbital skin lake; bill, legs and feet plumbeous.

Measurements. Wing 69 to 77 mm.; tail 33 to 37 mm.; tarsus about 14 mm.; culmen 12 to 14 mm.

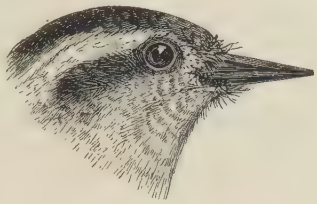

Fig. 7.—Head of *Y. h. hardwickii.*

Distribution. Southern India, excluding extreme South of Travancore, North to Khandesh on the West, to Bellary in the centre and to the Nullamalai Hills of Northern Madras on the East.

Nidification. Nothing on record.

Habits. Those of the species but it is more often found in the interior of forests.

(1381) Yungipicus hardwickii brunneiceps.

THE NORTHERN INDIAN PIGMY WOODPECKER.

Yungipicus hardwickii brunneiceps Stuart Baker, Bull. B.O.C., lxvii, p. 42 (1926) (Oodeypore).
Iyngipicus hardwickii. Blanf. & Oates, iii, p. 47 (part).

Vernacular names. *Chitta suruti pachi* (Tel.).

Description. Similar, sex for sex, to *Y. h. hardwickii* but much paler everywhere; the colour of the head is a light, almost yellowish, brown; the upper parts are a paler brown with more white, especially on the upper tail-coverts; the lower plumage is paler with pale brown streaks.

Colours of soft parts. As in the preceding race.

Measurements. Wing 74 to 80 mm.; tail 35 to 40 mm.; tarsus about 15 to 16 mm.; culmen 13 to 15 mm.

Distribution. Central and Northern India, North of the range of *Y. h. hardwickii.* It occurs in the Punjab and in the Kuman Terai in the foothills, extending into Bihar and into Bengal and Orissa.

Nidification. This Pigmy Woodpecker breeds from the end of February to April over the whole of Northern India and is particularly common in Bihar, where Inglis found them excavating

their tunnels in February but took fresh eggs as late as July. It nests principally in Mango-trees on the outskirts of Mango-groves, making the entrance to its tunnel at any height from the ground between five feet and forty feet. The entrance is very small, barely an inch in diameter, and the tunnel is usually bored in living branches. Often it is commenced at a spot where a smaller branch has broken off so that the surface for an inch or two is soft and easily worked. The eggs number two or three and are like others of this species but are the smallest of all those known. Twenty eggs average 17·9 × 13·7 mm.: maxima **19·2** × 14·0 and 18·5 × **14·1** mm.; minima **17·0** × 13·4 and 18·0 × **13·2** mm.

Habits. Much the same as those of the other races, but it is found more exclusively in open country.

(1382) Yungipicus hardwickii gymnopthalmos.

THE CEYLON PIGMY WOODPECKER.

Picus gymnopthalmos Blyth, J. A. S. B., xviii, p. 804 (1849) (Ceylon).
Iyngipicus gymnophthalmus. Blanf. & Oates, iii, p. 48.

Vernacular names. *Kerelia* (Cing.); *Marran-kotti, tachan-kuruvi* (Tam.).

Description. Sex for sex, very close to *Y. h. hardwickii* but darker above and with the lower parts either immaculate or with only faint indications of streaks; the streak from the eye through the ear-coverts is still broader and darker.

Colours of soft parts as in *Y. h. hardwickii.*

Measurements. Wing 71 to 76 mm.; tail 31 to 35 mm.; tarsus 14 to 15 mm.; culmen 12 to 13 mm.

Distribution. Ceylon and the extreme South of Travancore.

Nidification. Parker took nests of this little bird in Ceylon, one in February with two eggs and one in July with three, whilst Legge records it as breeding in the Western Province in February and March. It is said usually to select small dead branches, at a considerable height, in which to cut out its nest-holes. The eggs, two or three in number, measure about 18·8 × 13·5 mm.

Habits. Very similar to those of the other races. It feeds on the upper branches of high trees both in the open and on the edges of glades and rivers in forests, where its long thrilling note is usually the first notice one has of its presence. Legge draws attention to the way this Woodpecker sometimes perches on small branches, very much like a Barbet, a trait common to this genus but rarely seen in other Woodpeckers. It is a plucky little bird and has been seen to drive away Barbets from the vicinity of its nesting branch, although not half the weight of its adversary.

Genus **BLYTHIPICUS.**

Blythipicus Bonaparte, Consp. Volucr. Zygod., No. 98 (1854).

Type, *Blythipicus porphyromelas* Boie = *B. melanogaster* Hay.

The name *Blythipicus* antedates *Pyrrhopicus* Malherbe 1861 by many years and must be employed, whether we approve of the name or not. In this genus the bill is long and stout, the culmen angulate and almost straight; the nasal ridge is strongly developed, nearer to the culmen than to the commissure; the nostrils are open and not concealed by plumelets; the chin angle is about half-way between gape and tip of bill. The wings are rounded, the primaries only very slightly exceeding the secondaries in length. The outer pair of tail-feathers are longer than the coverts; the hind toe is well developed and the fourth toe a little longer than the third.

The general colour is bay banded with black.

Key to Species.

A. Larger, wing over 140 mm.; back strongly barred ..... *B. pyrrhotis*, p. 55.
B. Smaller, wing under 130 mm.; back not barred or only obsoletely so ..... *B. rubiginosus*, p. 57.

(1383) Blythipicus pyrrhotis pyrrhotis.

The Red-eared Bay Woodpecker.

Picus pyrrhotis Hodgs., J. A. S. B., vi, p. 108 (1837) (Nepal).
Pyrrhopicus pyrrhotis. Blanf. & Oates, iii, p. 50.

Vernacular names. *Fi-ing* (Lepcha); *Daoja-gadaia gajao* (Cachari).

Description.—Male. Forehead, chin, lores, cheeks and anterior ear-coverts pale fulvous-brown, darkening on the crown to brown with pale shafts; a scarlet crimson band, sometimes broken on the nape, extending to the sides of the neck behind the ear-coverts; whole upper parts, wings and tail barred rufous and black, the bars broadest on the wing and the black bars narrow on the tail; throat a darker brown than the chin, deepening into dull earthy chocolate-brown, the under tail-coverts redder and with indications of bars.

Colours of soft parts. "Iris dull crimson; orbital skin olive-brown; bill yellow, base tinged with green; feet olive-brown to brownish-black" (*Rob. & Kloss*).

Measurements. Wing 141 to 152 mm.; tail 74 to 90 mm.; tarsus about 29 to 30 mm.; culmen about 41 to 48 mm.

Female. Similar to the male but with no crimson collar. The iris is brown or red-brown.

Young birds. Under parts duller than in the female but everywhere faintly barred with rufous; head, nape and sides of neck blackish with broad chestnut median streaks.

Nestlings like the young birds but with more obvious barring below.

Distribution. Nepal to Eastern and Southern Assam and extreme Eastern Bengal; throughout Burma to Tenasserim and to Perak in the Malay Peninsula; Shan States, Western and Peninsular Siam. Gyldenstolpe also procured it at Sakong in North-West Siam and Robinson and Kloss in Annam.

Fig. 8.—Head of *B. p. pyrrhotis*.

Nidification. In Assam the Red-eared Bay Woodpecker breeds in May and June in forest of any kind so long as it has ample undergrowth. The nest-holes are bored either in living trees or in old stumps and almost invariably close to the ground, often within a few inches and never, so far as I have seen, ten feet above it. The eggs number two to four and twenty-five average 29·7 × 21·2 mm.: maxima **33·0** × 22·7 and 29·0 × **23·1** mm.; minima **27·1** × 22·0 mm. and 28·1 × **19·0** mm.

As with the majority of Woodpeckers, the male does practically the whole of the incubation during daylight.

Habits. This Woodpecker is found in Assam from the foothills up to about 6,000 feet, in Winter occurring also in the adjacent plains where, possibly, it may be a resident. In Sikkim it occurs up to at least 7,000 feet but is not apparently found in the lowest hills. It is a bird of thick forest where there is ample undergrowth and it keeps close to the ground, feeding much on fallen timber and frequently hunting ants and termites on the ground. It is one of the noisiest of Woodpeckers and has a very harsh metallic call. It is said to be sometimes found in small parties but I have never seen it except in pairs. In Annam Robinson and Kloss found it between 3,000 and 7,000 feet.

(1384) Blythipicus rubiginosus*.

THE MALAY BAY WOODPECKER.

Hemicircus rubiginosus Swainson, B. of W. Africa, ii, p. 150 (1837) (W. Africa *in errore, Malacca*).
Pyrrhopicus rubiginosus. Blanf. & Oates, iii, p. 51.

Vernacular names. None recorded.

Description.—Male. Forehead and face rufous-brown, darkening to deep brown anteriorly on crown, ear-coverts and throat; a crimson collar behind the ear-coverts to nape; upper parts dark brown overlaid with a crimson wash, strongest on the upper back, scapulars, wing-coverts and inner secondaries; wing-quills, coverts and tail lightly barred with pale fulvous and the rump and upper tail-coverts with traces of the same; lower parts dark brown; there is generally a trace of crimson on either side of the chin and often a faint crimson wash on the breast and posterior flanks.

Colours of soft parts. Iris dull to bright red; bill pale chrome-yellow, blackish about the nostrils and base of lower mandible; legs and feet dark chocolate-brown or purplish-brown.

Measurements. Wing 117 to 127 mm.; tail 61 to 68 mm.; tarsus about 23 to 24 mm.; culmen about 28 to 34 mm.

Female. Like the male but without the crimson collar.

Distribution. From Mergui in Tenasserim, South through the Malay Peninsula.

Nidification. Nothing recorded. Two eggs taken by Kellow near Perak were found, one on the 4th February together with two large young and one on the 17th advanced in incubation. Both were taken from nest-holes bored in dead trees on the fringe of heavy forest; they measure 32·0 × 24·0 mm. and 31·9 × 22·1 mm.

Habits. Those of the preceding bird but they are not found at any great heights.

Genus MIGLYPTES.

Miglyptes Swainson, Class. Birds, ii, p. 309 (1837).

Type, *Miglyptes tristis* Horsf.

In this genus the bill is of moderate length and much curved; there is no nasal ridge, whilst the nostrils are round and exposed; the chin-angle is half-way between the gape and the tip; the fourth or outer hind toe is longer than the third or outer front toe; the first toe or hallux is short; there is a short nuchal

* The name *rubiginosus* must stand as Swainson gave it with the generic name of *Hemicircus*. It is true that he also gave the name *rubiginosus* to another Woodpecker, but this was with the generic name of *Picus* (Swainson, Zool. Ill., pl. 14, 1820–21) and therefore does not invalidate the other.

crest; the wing is rounded; the tail-feathers pointed and strongly graduated, the outermost just extending beyond their coverts.

The general effect of the plumage is barred black, or dark brown and buff.

Key to Species.

A. Back with buff cross-bands; tail-feathers spotted	
a. Head barred above; rump uniform buff.	*M. grammithorax*, p. 58.
b. Head not barred above; rump barred with black	*M. tukki*, p. 59.
B. Back without cross-bands; tail unspotted.	*M. jugularis*, p. 60.

(1385) Miglyptes grammithorax.

The Fulvous-rumped Barred Woodpecker.

Phaiopicus grammithorax Malherbe, Picidæ, ii, p. 12 (1862) (Malay Pen.).
Miglyptes grammithorax. Blanf. & Oates, iii, p. 52.

Vernacular names. None recorded.

Description.—Male. Lores, cheeks, chin and short supercilium, the last sometimes absent, buff; upper part of head and hind-neck very narrowly barred black and buff; sides of head, ear-coverts, throat and fore-neck the same, but generally paler; rump buff; remainder of upper parts, wings and tail broadly barred buff and black; a broad moustachial stripe crimson; lower parts like the fore-neck, the bars gradually getting broader until on the vent, posterior flanks and tail-coverts they are as broad as on the back; under wing-coverts and axillaries buff, the latter sometimes spotted with black.

This little Woodpecker varies extraordinarily in general tint of plumage; in some the buff is replaced by creamy-yellow, in others by a rufous-buff. The underparts vary to the same extent and in a few birds there is a wash of chocolate or brown on these parts, though nowhere do they approach *M. tristis* of Java, from which they seem to be specifically separated.

Colours of soft parts. Iris brown to red-brown; bill black; legs and feet greenish-brown, dull green or plumbeous green.

Measurements. Wing 94 to 99 mm.; tail 44 to 50 mm.; tarsus 20 to 21 mm.; culmen about 16 to 19 mm.

Female. Similar to the male but with no red moustachial stripe.

Distribution. Tenasserim and South-West Siam through the Malay Peninsula to Borneo and Sumatra. A specimen in the British Museum labelled "Java" is possibly wrong.

Nidification. Nothing on record. Major J. C. Moulton obtained two very hard-set eggs from a hole bored in a branch of a dead tree on Mt. Seramba, Borneo. One of these, now in my

collection, measures 21·0 × 15·8 mm. Both this egg and one of *M. jugularis* (see *infra*) are a curious creamy-white, perhaps due to wood stain, but singularly uniform in appearance.

Habits. The Woodpeckers of this genus are all birds of heavy, humid forest and it is exceptional for them to come into open country or thinly wooded areas. They keep entirely to high trees in their search for food and, for the most part, to the higher trunks and branches of these, never descending to the ground. They go about in pairs and have a rather soft plaintive call.

(1386) Miglyptes tukki.

THE BUFF-NECKED BARRED WOODPECKER.

Picus tukki Less., Rev. Zool., 1839, p. 167 (Sumatra).
Miglyptes tukki. Blanf. & Oates, iii, p. 53.

Vernacular names. None recorded.

Description.—Male. Whole upper part of head and hind-neck uniform dark olive-brown; remaining upper plumage and visible portions of closed wings dark brown with numerous narrow bars of buff, sometimes fainter on the rump and lower back; tail dark brown with interrupted narrow bars of buff; primaries brown, notched with buff on the outer webs; inner secondaries like the wing-coverts, outer secondaries notched with buff on both inner and outer webs; a broad moustachial streak crimson; chin and throat buff with narrow bars of dark brown, changing to uniform brown on the fore-neck; remainder of lower plumage brown barred with buff, darkest on the breast and palest on the abdomen, where it is often more or less immaculate; under wing-coverts and edge of shoulder buff, more or less marked with black.

Colours of soft parts. Iris brown; upper mandible black, the lower mandible bluish-plumbeous, very pale at the base; legs and feet dirty green-brown, or dull plumbeous green.

Measurements. Wing 96 to 111 mm.; tail 59 to 65 mm.; tarsus 20 to 21 mm.; culmen 21 to 24 mm. Both the biggest and the smallest bird in the British Museum series come from Borneo.

Female and Young like the male but without the crimson moustachial stripe.

Distribution. Tenasserim from Bankasoon South-Western Siam, South through the Malay States to Borneo and Sumatra. I can trace no geographical differences throughout this area, though individual variations are great. Some specimens have nearly all the breast blackish and many from all localities have the greater part of the lower plumage unbarred.

Nidification. Nothing recorded.

Habits. Those of the genus.

(1387) Miglyptes jugularis.

THE BLACK-AND-BUFF WOODPECKER.

Picus jugularis Blyth, J. A. S. B., xiv, p. 195 (1845) (Arrakan).
Miglyptes jugularis. Blanf. & Oates, iii, p. 54.

Vernacular names. None recorded.

Description.—Male. Front of whole head black with narrow bars of buff, the latter decreasing on the posterior crown and disappearing on the crest and sides of head; a broad buff collar on the back and sides of neck; back, upper tail-coverts and tail black or brownish-black; lesser, median and inner greater coverts buff; shoulder of wing buff; remaining coverts black with tiny buff terminal specks; outer primaries black, notched with buffy-white on either web; the buff increasing gradually to broad bars on the innermost secondaries; a moustachial streak dull crimson; chin

Fig. 9.—Head of *M. jugularis.*

and throat black profusely spotted with buff; remaining underparts black or blackish-brown, the posterior flanks, vent and occasionally the abdomen more or less spotted with buff; under wing-coverts buff; axillaries black and buff.

Colours of soft parts. Iris brown; bill black; legs and feet dull plumbeous, greenish-plumbeous or bluish-brown.

Measurements. Wing 97 to 107 mm.; tail 43 to 51 mm.; tarsus about 18 to 19 mm.; culmen 18 to 20 mm. Throughout the range the variation in measurements is almost exactly the same.

Female only differs from the male in having no crimson streak.

Young. A young bird from Siam has the throat yellow-buff with black bases just showing through; the breast is deep olive and the spots on the head are sparse and small; the wing-quills are all black except the innermost secondaries which are buff with a broad black semi-bar near the end.

Distribution. Burma, from Arrakan and Karenni to Tenasserim as far South as Amherst; Annam, Siam and Cochin China.

Nidification. Hopwood took a single, hard-set egg of this

species on the 2nd March near Tavoy. The nest-hole was bored in a small dead tree in heavy forest.

The egg measures 22·0 × 17·2 mm. and is of the same creamy colour as that of *M. grammithorax*.

Habits. Those of the genus. This is said to be a very common little Woodpecker over a great part of Tenasserim in the lower hills and plains wherever these are heavily forested.

Genus MICROPTERNUS.

Micropternus Blyth, J. A. S. B. 1845, p. 194.

Type, *Picus brachyurus* Vieill.

First toe very small, with short claw; third and fourth toes subequal; bill as in *Miglyptes* but chin-angle nearer tip than gape; wing rounded; tail-feathers very pointed, outer pair just exceeding tail-coverts in length.

Micropternus brachyurus.

Picus brachyurus Vieill., Nouv. Dict. d'Hist. Nat., xxvi, p. 103 (1818).

Type-locality: Java.

Key to Subspecies.

A. Feathers of the throat with longitudinal streaks.	
a. Streaks on throat darker than colour of breast.	
a'. Smaller, wing average about 109 mm.	*M. b. brachyurus*.
b'. Larger, wing average about 122 mm.	*M. b. williamsoni*, p. 62.
b. Streaks concolorous with colour of breast.	
c'. Largest, wing average about 132 mm.	*M. b. humei*, p. 64.
d'. Intermediate, wing average about 124 mm.	*M. b. phaioceps*, p. 63.
e'. Smallest, wing average about 118 mm.	*M. b. mesos*, p. 65.
B. Feathers of throat squamated, not streaked.	
c. Larger, wing average about 122 mm.	*M. b. gularis*, p. 65.
d. Smaller, wing average about 116 mm.	*M. b. lanka*, p. 66.

In this species the range of individual variation reaches its extreme limits, rendering its division into geographical races very difficult. The *gularis* group is easily distinguished from the other two, though it is with some doubt I divide this again into a Northern and Southern subspecies.

As regards the *brachyurus* and *phaioceps* groups, the two are intermediate over so great an area in Burma that the difficulties are doubled. With the exception of the characters of the throat there is little else but size on which to depend and, even in this respect, interlapping is so great that it is with

some diffidence I maintain the races I accepted in 1919 (Ibis, 1919, pp. 197–204). They will, however, serve to draw attention to the fact that the general Oriental law of a decrease in size, North to South, is universally carried out in this species.

(1388) Micropternus brachyurus williamsoni.

THE SIAM RUFOUS WOODPECKER.

Micropternus brachyurus williamsoni Kloss, Ibis, 1918, p. 107 (Koh Lak, S.W. Siam).
Micropternus brachyurus. Blanf. & Oates, iii, p. 57 (part).

Vernacular names. None recorded.

Description.—Male. Whole plumage dull light chestnut-rufous; the top of the head, in all but the oldest birds, tinged with brown and often showing signs of streaks; feathers of the chin and throat streaked with a darker colour than the breast and pale-edged; birds from the more northern area have the streaks paler and more narrow *as a rule* and those from the southern districts broader and darker; upper parts, wings and tail narrowly barred with black, these bars being broadest in the younger birds and sometimes almost disappearing on the back in old birds; lower parts rather duller rufous than the back, barred to some extent with black on the posterior flanks, abdomen and under tail-coverts; feathers from the lores to behind the eye and on the upper ear-coverts tipped with crimson.

Colours of soft parts. Iris pale brown to red-brown; bill dark horny-brown, paler and more plumbeous green at the base of the lower mandible; legs and feet dull dirty brown to greenish-brown.

Measurements. Total length about 245 to 265 mm.; wing average about 122 mm., ranging from 107 to 132 mm.; tail 53 to 65 mm.; tarsus 22 to 23 mm.; culmen about 21 to 22 mm.

Female. Differs from the male only in having no crimson on the cheeks.

Young birds are more heavily barred than the adults both above and below, the bars on the lower plumage being crescentic in shape on the breast and upper abdomen.

Distribution. Peninsular Burma and Siam, North to Bangkok.

Nidification. Kellow found this Woodpecker breeding during February near Perak; Hopwood took eggs near Tavoy in April and Herbert took two nests with eggs near Bangkok in January and February.

The nest-hole is always made in an ants' nest. This latter is a curious round affair looking like a black cellular papier-maché foot-ball and is built on, or round about branches of trees, generally at a considerable elevation from the ground. As a rule it is well over twenty feet up and often over forty. The substance of these

nests is very tough and stands an immense amount of rough usage although in weight they are very light. The Woodpeckers cut an entrance in the middle of one side, work in for a few inches and then hollow a chamber out for the eggs. The ants' nest selected is often, I think almost invariably, a live nest, holding ants, pupæ and eggs, and on these the birds feed freely both whilst cutting out the nest and when incubating, as long as there are any to feed on. The eggs number two or three and are quite unlike other Woodpeckers' eggs. They are, of course, white when first laid but soon become nest-stained and within a few days are generally a uniform pale brown. The texture is very fine and strong, but the shells are thin, quite glossless and extraordinarily translucent though probably the ants' formic acid has some effect in intensifying this characteristic; in shape they are very oval, as a rule the smaller end being much the same as the bigger.

Eleven eggs average 27·1 × 19·5 mm.: maxima **29·8** × 20·8 and 28·9 × **21·0** mm.; minima **25·6** × 19·5 and 27·0 × **18·7** mm.

Habits. This Woodpecker frequents deciduous forest, especially where it is thin and free from undergrowth, secondary jungle growing in deserted cultivation and quite open country. It is found throughout the plains but does not ascend the hills to any height.

(1389) **Micropternus brachyurus phaioceps.**

THE NORTHERN RUFOUS WOODPECKER.

Micropternus phaioceps Blyth, J. A. S. B., xiv, p. 195 (1845) (Arrakan).
Micropternus phæoceps. Blanf. & Oates, iii, p. 55 (part).

Vernacular names. *Daoja-gadaiya tunti* (Cachari).

Description. Differs from *M. b. williamsoni* in having the streaks on the throat paler and more narrow and in being rather larger.

Colours of soft parts as in the other races.

Measurements. Wing average about 125 mm. (from 117 to 130 mm.); culmen 22 to 24 mm.

Distribution. Nepal, Sikkim, Assam North of the Brahmaputra, North and Central Burma, Shan States, North and West Siam.

Nidification. Exactly like that of the preceding bird but in Assam, where Dr. Coltart and I found many nests, they bred in May and June. Most birds selected ants' nests which were very conspicuous from a long distance away and they preferred such as were not in very heavy tree-jungle but in small spinneys, brushwood or actually in the open. The majority of the nests taken by us were built at a great height from the ground but Gammie, who took four nests in Sikkim during April and May, found them all about nine or ten feet up only. One

also, it should be noted, he found on a bamboo in dense forest. On one occasion putting in my hand to catch the bird which sat tight on his nest, I got severely bitten by the ants, but the Woodpeckers seem quite indifferent to their running about over them except in so far as they serve for light refreshment.

The eggs number three only and vary between 28·3 × 20·2 and 24·9 × 18·6 mm. In texture etc. they are like those of other races of this species.

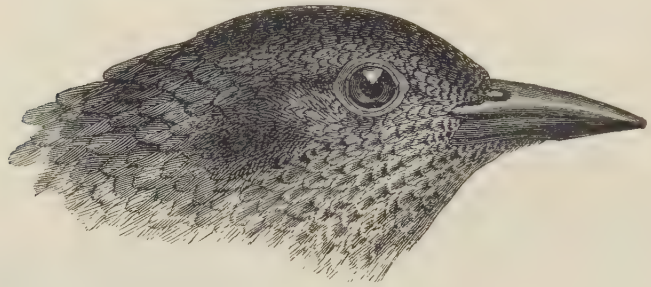

Fig. 10.—Head of *M. b. phaioceps*.

Habits. Similar to those of the last bird. The Rufous Woodpeckers frequent trees and bamboos and hunt for their diet, almost exclusively ants upon these but we have also seen them on the ground feeding upon termites and ants. They hunt in pairs and it is not unusual to see two pairs working close together, though independently. Their flight is much like that of the Green Woodpeckers and their voice is also somewhat like theirs but is softer and lower and much more seldom used. All the birds of this genus have a very strong pungent smell of formic acid which persists for a long time even in the skins.

(1390) Micropternus brachyurus humei.

THE WESTERN RUFOUS WOODPECKER.

Micropternus brachyurus humei Kloss, Ibis, 1918, p. 109 (Rohilkund).
Micropternus phæoceps. Blanf. & Oates, iii, p. 55 (part).

Vernacular names. None recorded.

Description. Similar to *M. b. phaioceps* but decidedly larger and, on an average, a paler chestnut-rufous with less black marking, the throat especially seeming paler. The bill is much longer than in any of the other races.

Colours of soft parts as in the other races.

Measurements. Wing average about 132 mm. (from 126 to 142 mm.); culmen 26 to 27 mm.

Distribution. North-West Himalayas, Kuman, Dehra Dun, Naini Tal and Buxa.

Nidification unknown.

Habits. Those of the species.

(1391) Micropternus brachyurus mesos.

THE ORISSA RUFOUS WOODPECKER.

Micropternus brachyurus mesos Kloss, Ibis, 1918, p. 109 (Kuttak, Orissa).
Micropternus phæoceps. Blanf. & Oates, iii, p. 55 (part).

Vernacular names. None recorded.

Description. Similar to *M. b. phaioceps* but smaller. This is a very doubtful race but has the dark throat of *phaioceps* and the small size of *williamsoni* and it seems therefore desirable to keep it distinct.

Colours of soft parts as in the other races.

Measurements. Wing average about 118 mm., ranging from 111 to 129 mm.; culmen 21 to 25 mm.

Distribution. Bengal, Bihar, North Orissa and Assam South of the Brahmaputra.

Nidification. This race breeds in Bengal, Bihar and Assam in April, May and June, throughout the plains up to at least 4,000 feet though not often over 3,000 feet. In every way nests and eggs are like those of the other races. I found incubation in one case lasted fourteen days and probably that is about the average time. The eggs number two or three in a clutch and twenty-two average 27·2 × 20·1 mm.: maxima **28·3** × 20·1 and 28·0 × **21·0** mm.; minima **25·0** × 20·1 and 28·1 × **18·9** mm.

Habits. Those of the species. I never found anything but ants and termites, together with pupæ and eggs, in their stomachs.

(1392) Micropternus brachyurus gularis.

THE SOUTHERN RUFOUS WOODPECKER.

Picus gularis Jerdon, Madr. Jour. Lit. Sci., xiii, p. 139 (1844) (Southern India).
Micropternus gularis. Blanf. & Oates, iii, p. 57 (part).

Vernacular names. None recorded.

Description. Differs from the four preceding races in having the feathers of the throat squamated; the centres are dark chestnut with broad black subedges and sharply defined, narrow pale edges.

Colours of soft parts as in the other races.

Measurements. Wing average about 122 mm., from 113 to 129 mm.; culmen 21 to 25 mm.

Distribution. India, South of Orissa on the East and South of Bombay on the West.

Nidification. Similar to that of the other races. Davidson found it breeding during February, March and April in Kanara and Stewart took eggs during the same months in Travancore. The eggs vary between 30·2 × 21·8 and 24·8 × 17·3 mm.

Davidson remarks on the breeding of this bird: "All were in the centre of a nest of *Crematogaster* ants . . . and the ants' nest chosen is generally between fifteen and twenty feet from the ground. The ants certainly do not desert the nest when occupied and I have been terribly punished when putting my hand into a nest even when it has contained small young of this bird."

Habits. Those of the species. This race seems to be more often found in deeper, denser forest than the other races. Davidson found it in thick jungle in Kanara and Bourdillon records it as being found in Evergreen forest in Travancore.

(1393) Micropternus brachyurus lanka.

THE CEYLON RUFOUS WOODPECKER.

Micropternus brachyurus lanka Kloss, Ibis, 1918, p. 108 (Ceylon).
Micropternus gularis. Blanf. & Oates, iii, p. 57 (part).

Vernacular names. *Kerella* (Cing.); *Maran-kotti* (Tam.).

Description. Similar to *M. b. gularis* but smaller.

Colours of soft parts as in the other races.

Measurements. Wing average about 116 mm., from 110 to 120 mm.; culmen 21 to 24 mm.

Distribution. Ceylon and South Travancore.

Nidification. Unknown.

Habits. In Ceylon this Woodpecker is found practically throughout the plains and in the lower hills up to 2,000 feet, frequenting, according to Wait, forest and well-wooded gardens. Like the other races it feeds almost exclusively on ants and hunts for these both on trees and on the ground.

Genus BRACHYPTERNUS.

Brachypternus Strickland, Ann. Mag. Nat. Hist. 1841, p. 35.

Type, *Brachypternus aurantius* Linn.

In this genus the bill is about the same length as the head, the culmen slightly curved and the nasal ridge placed close to the culmen but not much developed; the nostrils are exposed; the hind toe is very small and the third and fourth toes are about equal in length; the wings and tail are longer in proportion than they are in *Micropternus*; the outer tail-feathers are longer than the upper tail-coverts; there is a red occipital crest in both sexes, the male having the crown also red whilst

the female has it black spotted with white. There is only one species, which is peculiar to India and Ceylon.

In my Catalogue I treated all forms of the genus as being races of *Brachypternus aurantius* (=*benghalensis*), being chiefly influenced in so doing by the fact that no two forms ever breed in the same area though, as recorded by Wait (Birds of Ceylon, p. 177), *B. b. erithronotus* and *puncticollis* (*ceylonus* in this vol.) intergrade where the two meet. Wait has shown me specimens in his own collection forming a complete intergradation between the two races.

Brachypternus benghalensis.

Key to Subspecies.

A. Back some shade of yellow.
  a. Throat streaked black and white.
    a'. Back golden-yellow ..... *B. b. benghalensis*, p. 67.
    b'. Back lemon-yellow ..... *B. b. dilutus*, p. 69.
  b. Throat spotted black and white.
    c'. Back orange-yellow; wing over 140 mm. ..... *B. b. puncticollis*, p. 69.
    d'. Back less orange; wing under 135 mm. *B. b. ceylonus*, p. 70.
B. Back crimson ..... *B. b. erithronotus*, p. 71.

(1394) Brachypternus benghalensis benghalensis.

The Northern Golden-backed Woodpecker.

Picus benghalensis Linn., Syst. Nat., 10th ed., i, p. 113 (1758) (Bengal).
Brachypternus aurantius. Blanf. & Oates, iii, p. 58 (part).

Vernacular names. None recorded.

Description.—Male. Forehead and crown black, the feathers tipped with crimson; occipital crest crimson; nape and upper back black; lower back and scapulars golden-yellow; rump and upper tail-coverts velvety-black; tail dull black; lesser, median and primary coverts black, all but the last with terminal yellowish spots; greater coverts black at the base, golden-yellow on the terminal half with paler yellow spots; quills black, notched on the outer, barred on the inner webs with white, the inner secondaries golden-yellow on the outer webs; lores and ear-coverts spotted black and white; a line below the crown and another from the ear-coverts to the neck black; between these two lines and below the latter white; chin, throat and sides of head below the bill streaked black and white, remainder of lower plumage buffy-white streaked with black, boldly so on the breast, narrowly on the abdomen and flanks; under tail-coverts black with white spots; axillaries and under wing-coverts black and white.

Colours of soft parts. Iris brown to deep red; orbital skin dull green or [illegible] green; bill horny or slaty-black, sometimes

a little paler at the base of the commissure; legs and feet dark green or greenish-brown.

Measurements. Wing 138 to 152 mm.; tail 84 to 91 mm.; tarsus 25 to 27 mm.; culmen about 30 to 37 mm.

Female. Has the forehead and crown black with white spots.

Young birds are like the female but much duller and browner and have no white spots on the crown or forehead.

Distribution. India from the foothills of the Himalayas East to Assam and Manipur, West to the Punjab and South to Khandesh in Bombay, North Central Provinces and the South of Orissa. It is found in the Northern districts of Assam though very rare East of the Kamrup District.

Birds from Eastern Bengal, Assam and Manipur are rather deep-coloured and often show traces of crimson on the back as in *B. b. puncticollis* but they retain the streaked throat of the *B. b. benghalensis* and are nearest to this form.

Nidification. Over Northern India this bird breeds in great numbers wherever the country is suitable and seems to have two breeding-seasons, first from March to the end of April and again from the middle of June to August, many birds probably having two broods. It selects trees in thin forest or in the open and is very common round towns and villages, breeding in the mango orchards. As a rule the entrance is made quite low down, between five and fifteen feet from the ground, but sometimes it is very high up and occasionally even nearer the ground. In most cases a hollow branch or trunk is selected, the birds merely cutting an entrance into this which may be anything from three to four and a half inches in diameter. They use the same nesting-site for several years in succession but have a curious habit of carving out a new entrance each season, however convenient and sound the old one may be. If a living branch is selected for boring a very short tunnel only is made, but when rotten I have known it to be as long as three feet. The eggs number four or five, but three and occasionally two only are incubated. They are of the usual glossy china-white and fifty eggs average 28·1 × 20·9 mm.: maxima **30·6** × 19·0 and 29·6 × **23·0** mm.; minima **26·0** × 20·6 and 27·5 × **18·9** mm.

As usual the greater part of the incubation is carried out by the male and the birds probably pair for life.

Habits. The Golden-backed Woodpecker is one of the most familiar of Indian birds and there are few gardens or orchards in which its harsh voice is not constantly to be heard. Heavy, humid forest it avoids and it is rare in the driest, almost treeless areas which occur here and there within the limits of its range. It is a very bold confiding bird and takes little notice of an observer who is not actively aggressive. For the most part it keeps to trees, though these may be of any height, and it has the usual Woodpecker habit of alighting low down on the trunk

and then working its way to the top in rapid spirals, often uttering its cry as it does so, though in less screaming vigour than when it is on the wing. It feeds largely on ants and follows these to the ground but it eats almost every kind of insect, in all stages, which it can obtain from crannies in the bark etc. I have seen it make clumsy and ineffective attempts to catch butterflies on more than one occasion.

It ascends the hills and the foothills of the Himalayas up to some 3,000 feet but rarely much higher than this.

(1395) Brachypternus benghalensis puncticollis.

THE SOUTHERN GOLDEN-BACKED WOODPECKER.

Brachypternopicus puncticollis Malherbe, Rev. Zool., 1845, p. 405 (Ceylon).
Brachypternus aurantius. Blanf. & Oates, iii, p. 58 (part).

Vernacular names. *Maran-kotti, Tachan-kuruvi* (Tam.).

Description.—Male. Similar to the preceding Northern race but having the back much darker, an orange-golden, often marked to some extent with crimson; the white on the chin, throat and fore-neck is restricted to small spots; the ear-coverts and sides of the fore-neck and breast are much more black; the white markings on the wings are generally smaller.

Colours of soft parts as in the preceding race.

Measurements. Wing 140 to 148 mm.; tail 80 to 91 mm.; tarsus 25 to 26 mm.; culmen 29 to 37 mm.

Female and Young differ from the same of *B. b. benghalensis* in degree of coloration just as the males differ.

Distribution. India South of the range of the last bird.

Nidification. Similar to that of the Northern bird but very few eggs have been taken or described. Kinloch obtained it breeding in the Nelliampathy Hills in March, the nest containing two eggs which measure 34·7 × 22·0 and 33·9 × 21·7 mm. These are, assuredly, abnormally large.

Habits. These differ in no way from those of the other races though it may more often be found in rather denser forest. It ascends the hills of Southern India up to about 3,000 feet.

(1396) Brachypternus benghalensis dilutus.

THE SIND GOLDEN-BACKED WOODPECKER.

Brachypternus dilutus Blyth, Cat., p. 56 (1852) (Sind).
Brachypternus aurantius. Blanf. & Oates, iii, p. 58 (part).

Vernacular names. *Drakhan* (Sind).

Description. Sex for sex the Sind bird differs from the preceding races in having the upper parts a much paler yellow

and showing on them obsolete and indistinct darker tipping to the feathers; the white wing-spots are larger and the white of the lower surface is purer and more extensive on the chin, throat and fore-neck.

Colours of soft parts as in the other races.

Measurements. Wing 142 to 147 mm.; culmen 28 to 37 mm.

Distribution. Sind, Baluchistan and N.W. Frontier. Ticehurst includes the Punjab birds in this race but the specimens in the British Museum from that Province seem nearer true *benghalensis*.

Nidification. Doig records that it breeds in Sind during April and Ticehurst says that "its works of carpentry are in evidence on all sides." It breeds in the trees planted as avenues along roadsides and also in the Tamarisk jungle where the trees attain great size and have plenty of dead and rotten branches.

Habits. This is a very common bird in Sind wherever there are sufficient trees to attract it but in the more arid parts of the country it is rare. It has the same dipping flight, the same raucous call and the same habits as the other races of the species.

(1397) Brachypternus benghalensis ceylonus.

THE CEYLON GOLDEN-BACKED WOODPECKER.

Picus ceylonus Cuv., Règne Anim., i, p. 451 (1829) (Ceylon).
Brachypternus erythronotus. Blanf. & Oates, iii, p. 60 (part).

Vernacular names. *Kerella* (Cing.); *Maran-kotti*, *Tachan-kuruvi* (Tam.).

Description. Differs from *B. b. puncticollis* in its much smaller size and in being a paler colour above, more yellow with less orange tinge.

Colours of soft parts. Iris red; bill blackish; legs and feet dusky green (*Wait*).

Measurements. A much smaller bird than *B. b. puncticollis*; wing 127 to 134 mm.; culmen about 24 to 32 mm.

Distribution. Northern Ceylon only.

Nidification. The only eggs I have seen of this race were taken by Phillips at Anasigalla: one clutch of three was taken on the 20th March from a tree in small jungle on the boundaries of a Tea Estate and the second, a single egg only, from a hole in a dead coconut palm on the 19th August. These eggs measure 27·3×19·0 mm.; 26·2×19·6 mm.; 26·4×19·0 and 26·3×19·2 mm.

Habits. Those of the species. In the dry Northern areas the bird is a quite typical, though very small, *B. b. puncticollis*, but

in the central, wetter and better forested areas, birds show a considerable amount of red on the upper plumage though they retain their smaller measurements. It is a very common bird over most of its range and haunts the vicinity of villages and gardens as well as forest.

(1398) Brachypternus benghalensis erithronotus.

THE CEYLON RED-BACKED WOODPECKER.

Picus erithronotus Vieill., Nouv. Dict. d'Hist. Nat., xxvi, p. 73 (1818) (Ceylon).
Brachypternus erythronotus. Blanf. & Oates, iii, p. 60 (part).

Vernacular names. *Kerella* (Cing.).

Description.—Male. Similar to *B. b. benghalensis* but with the golden-yellow of the upper plumage replaced by crimson; a wash of this extends on to the black of the rump and the white spots on the coverts and inner secondaries are tinged with pink instead of yellow; the black on the sides of the head and lower plumage is greater in extent and the white less, that on the chin and throat being confined to spots or narrow bars.

Colours of soft parts as in *B. b. ceylonus.*

Measurements. Wing 135 to 146 mm.; tail 88 to 98 mm.; tarsus 25 to 26 mm.; culmen about 33 to 38 mm.

Female. Differs from the male in having the forehead and crown black, spotted with white.

Distribution. Ceylon.

Nidification. The Red-backed Woodpecker breeds in the wetter, more heavily forested portions of the South of Ceylon, cutting its nest-hole in the trunks of coconut or other trees standing either in forest or in open but well-wooded country. It apparently has two well-defined breeding-seasons, the first in March and April, the second in August and September. They lay two or three eggs which only differ, as might be expected, from those of the last bird in their much greater size. Eight eggs average 29·6 × 22·3 mm.; a larger series would probably average smaller.

Habits. In the South this is the most common of the Ceylon Woodpeckers, its harsh cry being a frequent sound both in deep forest and in the gardens and village surroundings. It is said to be generally found in pairs and to feed principally on red ants. In flight, voice and most of its habits it resembles the other forms of this species, only differing in so often haunting dense forests.

Genus DINOPICUS.

Dinopicus Rafinesque, Précis des découvertes et travaux semiologiques, p. 2 (1814).

Type, *Picus javanensis* Ljung.

The name *Tiga* employed by Blanford for this genus is of Kaup, 1836 and is therefore 22 years later than Rafinesque's and cannot be employed.

The genus is superficially very close to *Brachypternus* but has no hallux (first digit or inner hind toe); the coronal feathers are more elongate and the wing more pointed.

Key to Species.

A. A single black line down the centre of the throat ..... *D. javanensis*, p. 72.
B. Two black lines down the sides of the throat divided by a brownish space .. *D. shorii*, p. 74.

Dinopicus javanensis.

Picus javanensis Ljung, Kon. Vet. Ac. Handl., 1797, p. 134.

Type-locality: Batavia.

The typical form differs from any of our Indian forms in its smaller size.

Key to Subspecies.

A. Paler and brighter with larger black nuchal patch.
  a. Smaller, wing 118 to 139 mm. ..... *D. j. javanensis*.
  b. Larger, wing 136 to 165 mm..... *D. j. intermedia*, p. 72.
B. Darker and more olive, with smaller nuchal patch ..... *D. j. rubropygialis*, p. 73.

(1399) Dinopicus javanensis intermedia.

The Burmese Golden-backed Three-toed Woodpecker.

Picus intermedius Blyth, J. A. S. B., 1845, p. 193 (Arrakan).
Tiga javanensis. Blanf. & Oates, iii, p. 61 (part).

Vernacular names. *Hua-kwan-deng* (Siam).

Description.—Male. Crown and long occipital crest crimson, the feathers at the base black; hind-neck and extreme upper back black: back, scapulars, wing-coverts and outer webs of inner secondaries golden-yellow with olive centres; lower back and rump crimson; upper tail-coverts black; tail black; all coverts along edge of wing black; quills black with broken bars of white on the inner webs; a very narrow short supercilium and a line from the eye to the neck through the ear-coverts

black; rest of sides of head and neck white; a black streaky line from the base of the lower mandible down each side of the chin and throat fulvous-white or brownish-white in between, with a third black line down the centre; lower plumage fulvous or brownish-white, each feather edged with black, very broadly on the breast and narrowing towards the abdomen and posterior flanks.

Colours of soft parts. Iris brown or hazel; bill almost black tinged on the basal half with brown or plumbeous; legs and feet dull brownish-green.

Measurements. Wing 136 to 165 mm.; tail 89 to 102 mm.; tarsus 23 to 24 mm.; culmen 27 to 30 mm.

Female. Differs from the male in having the crown and occipital crest black, streaked with white.

Distribution. Very rare in Cachar and Manipur; Burma North of 10°; Shan States, Yunnan, Siam and Cochin China.

Nidification. Oates took three fresh eggs of this Woodpecker in Pegu on the 7th May; Bingham took another three in Tenasserim on the 22nd March, whilst Herbert took three near Bangkok on the 14th June. The nest-hole seems to be generally bored low down in some small tree standing in thin forest or jungle, or in open well-wooded country. Nine eggs average 28·9 × 18·9 mm.

Habits. Very similar to those of the genus *Brachypternus*; these Woodpeckers haunt, principally, well-wooded open country and thin deciduous forest or dry secondary growth; their flight is much the same as that of the birds of that genus and they utter the same harsh cry, both as they fly and when hunting for food on the trunks and branches of trees. Preferably they keep to the lower trees and often hunt on fallen trees for the insects etc. which these harbour in such great numbers.

(1400) Dinopicus javanensis rubropygialis.

THE MALABAR GOLDEN-BACKED THREE-TOED WOODPECKER.

Picus rubropygialis Malherbe, Rev. Zool., 1845, p. 400 (Bengal, Orissa).
Tiga javanensis. Blanf. & Oates, iii, p. 61 (part).

Vernacular names. *Mannu tolachi* (Tel.); *Manam tolashi* (Tam.).

Description. Differs sex for sex from the previous race in being much duller and darker; the back is more olive and less golden. It is also a much smaller bird.

Colours of soft parts as in the preceding race.

Measurements. Wing 127 to 142 mm.; tail 84 to 93 mm.; tarsus 23 to 24 mm.; culmen 27 to 29 mm.

Distribution. The South-West coast of India from Travancore to Kanara, the hills of Mysore and Western Madras. Orissa.

Nidification. Bourdillon found this bird breeding in the Assamboo Hills in March whilst both he and Stewart took eggs in Travancore from early February to the middle of April and, rarely, into May. The nest-holes are bored either in living trees or in dead ones which are more or less rotten and those selected generally stand in orchards or open country. As a rule, the entrance is made at some height under twenty feet from the ground but Bourdillon once took eggs from a hole in a mango-tree about thirty feet up. The number of eggs laid is two or three, sometimes one only. Fifteen eggs average 29·4×20·4 mm., but two clutches are abnormally large and a larger series would undoubtedly average much less: maxima 31·0×23·0 mm.; minima 27·3×18·0 mm.

Habits. Those of the genus. It ascends the hills up to considerable elevations but is comparatively scarce above 3,000 feet.

(1401) Dinopicus shorii.

THE HIMALAYAN GOLDEN-BACKED THREE-TOED WOODPECKER.

Picus shorii Vigors, P. Z. S., 1831, p. 175 (Himalaya Mts.) (Simla-Almora).
Tiga shorei. Blanf. & Oates, iii, p. 62.

Vernacular names. *Thit touk* (Burmese).

Description.—Male. This Woodpecker differs from all races of *D. javanensis* in having a double line of black down the centre of the throat, the intermediate space being pale brown; the bases of the feathers of the crown are pale grey, often white next the crimson, making these parts much brighter than in either *D. j. intermedia* or *D. j. rubropygialis.*

Colours of soft parts. Iris brown, red or crimson, possibly a question of age; bill dark slaty or blackish; legs and feet plumbeous or greenish-brown.

Measurements. Wing 146 to 162 mm.; tail 95 to 103 mm.; tarsus 23 to 24 mm.; culmen 32 to 36 mm.

Female. Differs from *D. javanensis*, all races, in having the forehead and fore-crown much browner and the whole crown with much longer white streaks.

Distribution. Lower Himalayas from Kaladongi (Doon) to Eastern Assam, Cachar, Manipur, North-West Burma, Arrakan and Pegu.

Nidification. Three eggs of this species were brought to me by a Naga together with a female he had caught in the nest-hole. It was taken on the 17th April at Gunjong, N. Cachar, 2,500 feet elevation. The nest-hole, which I afterwards examined, was made in an oak-tree standing in park-like grass-land, thickly

dotted over with oak-trees. The entrance was about four feet from the ground. The three eggs measure 31·3 × 19·7 mm., 30·3 × 21·0 and 30·3 × 18·9 mm.

A second set of two eggs taken in the Khasia Hills in a very similar position on the 13th April, measure 32·0 × 22·4 and 32·1 × 21·6 mm.

Habits. Very similar to those of other species of *Dinopicus* but it is more often found in forest, especially deciduous. It appears to be a rare bird almost everywhere and there is little recorded about it; it is least uncommon along the foot-hills of the Western Terai from practially the level of the plains up to some 4,000 feet but generally under 2,000 feet. Eastwards it becomes more and more rare and has not been recorded from the Chin Hills. In Pegu and the Kachin Hills, however, it once more becomes rather more numerous.

Genus **CHLOROPICOIDES.**

Chloropicoides Malherbe, Bull. Soc. Hist. Nat. Moselle, v, p. 26 (1849).

Type, *Picus rafflesi* Vigors.

The name *Gauropicoides* Malherbe dates from 1861 and is antedated by his own name *Chloropicoides* of 1849, which must therefore be used.

The genus *Chloropicoides* is one of the three-toed group but differs from *Brachypternus* in having a bill with the culmen straight and sharply angulate, the nasal ridge near the culmen well marked and the nostrils at the base of the bill covered by short plumes; wings rounded and tail-feathers narrow.

Chloropicoides rafflesi.

Picus rafflesi Vigors, Raffles Mem., App., p. 669 (1830).

Type-locality: Sumatra.

The typical bird differs from that found in Tenasserim in being much smaller; wing average 134 as against 144 mm.

(1402) Chloropicoides rafflesi peninsularis.

THE MALAYAN THREE-TOED WOODPECKER.

Gauropicoides rafflesi peninsularis Hesse, Ornith. Monatsb., xix, p. 192 (1911) (Malacca).
Gauropicoides rafflesi. Blanf. & Oates, iii, p. 63.

Vernacular names. None recorded.

Description.—Male. Lores and edge of forehead yellowish, crown and crest scarlet-crimson; hind-neck black; back, scapulars,

inner coverts and inner secondaries and rump golden-olive, brightest and most golden on the lower back and rump, often tinged with crimson on the latter; upper tail-coverts dark brown; tail black; outer wing-coverts and quills black, the inner webs of the primaries and outer secondaries with a few broad bars of white; a white supercilium to the nape; below this a broad black band to the nape; a second black streak from the gape to the shoulders and between these two streaks a fulvous-white patch; chin, throat and fore-neck bright fulvous-white; remaining lower plumage olive-brown, the flanks sparsely spotted with white.

Colours of soft parts. Iris dark brown; bill slaty-grey, the tip and culmen almost black; legs and feet dark green.

Measurements. Wing 143 to 154 mm.; tail 103 to 111 mm.; tarsus about 25 to 26 mm.; culmen about 29 to 35 mm.

Female. Has the whole cap black instead of crimson.

Young birds are like the female but duller and more spotted below. Young males acquire the scarlet on the crest first and later on the crown.

Distribution. The Malay Peninsula, South-West Siam and Tenasserim as far North as Moulmein.

Nidification. Unknown.

Habits. Similar to those of the genus *Dinopicus* but the birds frequent only very dense forest and never come into open country. Its voice and flight are similar to those of *Brachypternus* and *Dinopicus* and, like the latter genus, it keeps much to the lower parts of trees and to those which have fallen down, though it is said not to venture actually on to the ground.

Genus **CHRYSOCOLAPTES.**

Chrysocolaptes Blyth, J. A. S. B., xii, p. 1004 (1843).

Type, *Picus strictus* Horsf.

In this genus the bill is long and straight, the nostrils long and expanded and the nasal ridge strongly developed, commencing at the base of the bill and about half-way between commissure and culmen. The feet are exceptionally strong, with the hallux well developed and the claws long and strong; the outer tail-feathers slightly exceed the coverts in length.

Key to Species.

A. Crown of male red, of female yellow; back black ..... *C. festivus*, p. 77.
B. Crown of male red, of female spotted with white; back golden-olive ..... *C. guttacristatus*, p. 78.

(1403) Chrysocolaptes festivus.

THE BLACK-BACKED WOODPECKER.

Picus festivus Bodd., Tab. Pl. Enl., p. 43 (1783) (Goa).
Chrysocolaptes festivus. Blanf. & Oates, iii, p. 64.

Vernacular names. None recorded.

Description.—Male. Forehead buff, the feathers with concealed black lores and centres; crown and crest crimson; supercilium brownish-buff turning white in a broad white patch down the sides of the neck and joining the white hind-neck and upper back; crown crimson surrounded by black, generally almost hidden; lower back, scapulars, wing-coverts next the back, rump and upper tail-coverts dull black edged with rich velvety black; tail black; greater and median wing-coverts and outer webs of inner secondaries golden-olive, sometimes with flecks of crimson here and there; outer edge of wing and quills dark brownish-black, the primaries with two fulvous notches on the outer webs and bold spots of white on the inner; outer secondaries narrowly edged with golden-olive and inner webs spotted with white; a broad black line, including the ear-coverts, from the eye to the shoulders; chin, cheeks, throat, and fore-neck fulvous-white with five narrow black streaks; remaining underparts buffy-white, the feathers edged with black, boldly on the breast, narrowly on the posterior flanks and obsolete on the abdomen.

Colours of soft parts. Iris crimson, brown in young birds; bill slaty or brownish-black; legs and feet horny or greenish-plumbeous.

Measurements. Wing 152 to 157 mm.; tail 73 to 82 mm.; tarsus about 25 to 26 mm.; culmen about 29 to 35 mm.

Female. Crown and crest golden-yellow instead of crimson, otherwise as in the male.

Young birds apparently have the crown black spotted with white, if we can judge from the young of the closely allied *C. strictus*.

Distribution. Ceylon; India in Travancore and Malabar, where it is rare, Bombay Presidency, Central India, North to Dehra Dun, Oudh, Bihar and Chota Nagpore. There are specimens in the British Museum labelled Sikkim and Assam, possibly in error. It is nowhere common except in Central India and in parts of Bihar.

Nidification. Howard Campbell took one egg of this Woodpecker in the Nilgiris from "a hole in a tree, growing in a *shola* of mixed forest," on the 28th January and Stewart obtained a second in Travancore on the 4th February from a hole in a tree in deciduous forest. The two eggs measure $29{\cdot}9 \times 24{\cdot}2$ and $32{\cdot}1 \times 25{\cdot}9$ mm. They are curiously round for eggs of this family. Davidson says that in Kanara they breed from November

to January and that he has never seen more than one young with the parent birds. They breed in thin forest or in lighter parts of the heavier forest.

Habits. This fine Woodpecker keeps much to forest and to thin scrub but is occasionally seen both in denser forest and in comparatively open country. It ascends at least as high as 4,000 feet and is found in the foothills and broken country adjacent to the plains but is rare in the plains themselves. Its flight is slow and laboured and its raucous notes are constantly uttered both when flying and when on trees.

Chrysocolaptes guttacristatus.

Key to Subspecies.

A. Breast golden-yellow or olive, not crimson.	
a. Back more gold, less olive.	
a'. Smaller, wing 157 to 178 mm. ..	*C. g. guttacristatus*, p. 78.
b'. Larger, wing 172 to 190 mm. ..	*C. g. sultaneus*, p. 80.
b. Back darker, more olive, less gold ..	*C. g. delesserti*, p. 80.
B. Back crimson	*C. g. stricklandi*, p. 81.

(1404) Chrysocolaptes guttacristatus guttacristatus.

TICKELL'S GOLDEN-BACKED WOODPECKER.

Picus guttacristatus Tickell, J. A. S. B., ii, p. 578 (1833) (Borabhum, W. Bengal).
Chrysocolaptes gutticristatus. Blanf. & Oates, iii, p. 65 (part).

Vernacular names. *Tashi-on-bau* (Lepcha); *Daoja gadaiya* (Cachari).

Description.—Male. Edge of forehead and upper half of lores brown; whole crown and crest crimson, edged with a concealed line of black; nape and hind-neck white; back, scapulars and visible portions of closed wings, except primaries and outer coverts, golden-olive with metallic-golden edges, sometimes tinged with crimson; rump crimson; upper tail-coverts and tail black; a line from the eye to the neck white; a broader line from the eye, through the ear-coverts and down the sides of the neck black; this line broadens again on the shoulders and passes in a broken line behind the white hind-neck; outer coverts and primaries dark brown, spotted and indistinctly tipped with white or buffy-white on the inner webs; cheeks, chin and throat white, with five narrow lines of black, merging into one another on the fore-neck; remainder of lower plumage sullied white, each feather edged with black, broadest on the breast, least on the abdomen.

Colours of soft parts. Iris yellow, creamy-yellow to pinkish-brown; bill slaty or "bluish-brown" (*Oates*); legs greenish-slate to greenish-brown.

Measurements. Wing 157 to 178 mm., average 168·4 mm.; tail 85 to 97 mm.; tarsus 30 to 31 mm.; culmen 43 to 56 mm. and exceptionally up to 60 mm.

Female. Whole crown and crest black spotted with white, otherwise as in the male.

Young birds have the crown and crest as in the female, the male quickly acquiring the crimson occipital crest and, later, the crimson crown.

Distribution. Bengal, Bihar, Assam, Burma North of Rangoon, Siam South to Bangkok.

Fig. 11.—Head of *C. g. guttacristatus*, ♂.

Nidification. This is an extremely common breeding-bird in Assam, laying during the months of March, April, and May. Preferably a tree standing in light forest or in tree-dotted grass-land is chosen as a site for the nest-hole, but I have also seen these bored in trees in heavy, humid forest, mixed bamboo- and scrub-jungle and in dead trees in cultivation. Normally the entrance is excavated somewhere between five and fifteen feet from the ground but I have seen one forty feet up a cotton-tree and a second practically level with the ground. Nearly always a tree is selected with fairly sound exterior and a rotten inside; the entrance is large, three inches or over, whilst the channel is anything from six to eighteen inches long. The eggs number four or five, occasionally six and equally rarely two or three. Forty eggs average 30·0 × 22·1 mm.: maxima **33·1** × 23·3 and 31·6 × **24·0** mm.; minima **26·4** × 23·0 and 27·0 × **20·0** mm.

Like most Woodpeckers this species lays its eggs at very irregular intervals. I have often seen two or three young of varying ages in a nest with eggs still unhatched. In one nest were a nearly fully-fledged youngster, two half-fledged and two only recently hatched. A very large percentage of eggs are addled and probably one out of every three clutches contain such.

Habits. This Golden-backed Woodpecker is found in pairs both in the plains and hills up to about 5,000 feet, most often below 3,000 feet. It frequents any kind of country which is well wooded, feeding almost entirely on trees but also on the ground when there are flights of ants or termites. Its harsh, rather prolonged call is uttered not only as it flies from one tree to another but also as it climbs about on the trees. During the courting-season the male utters a curious little croak as it pursues the female, the latter squeaking whenever for a moment or two the male ceases its attention.

(1405) Chrysocolaptes guttacristatus sultaneus.

HODGSON'S GOLDEN-BACKED WOODPECKER.

Picus sultaneus Hodgson, J. A. S. B., vi, 1837, p. 105 (Nepal).
Chrysocolaptes guttacristatus. Blanf. & Oates, iii. p. 65 (part).

Vernacular names. None recorded.

Description. Exactly like *C. g. guttacristatus* but decidedly larger, with a bill comparatively larger still.

Colours of soft parts as in the other races.

Measurements. Wing 172 to 190 mm., average 180·5 mm.; tail 92 to 102 mm.; tarsus 30 to 31 mm.; culmen 50 to 63·5 mm., generally 60 or over.

Distribution. Nepal, including the Terai; Garhwal and Kuman. Sikkim birds are intermediate between this and the preceding race.

Nidification. Similar to that of the preceding race. In the Kuman Terai, Whymper took eggs in February and early in April at about 4,000 feet. These vary from 30·3 × 21·3 mm. to **34·3** × 21·3 and 31·8 × **23·1** mm.

Habits. This race is found from the foothills to about 5,000 feet in its more Western range. The intermediate Sikkim birds do not appear to ascend much over 3,000 feet and Stevens says that he has not met with them over 2,000 feet.

(1406) Chrysocolaptes guttacristatus delesserti.

MALHERBE'S GOLDEN-BACKED WOODPECKER.

Indopicus delesserti Malherbe, Mém. Acad. Metz, 1848, p. 343 (Malabar).
Chrysocolaptes guttacristatus. Blanf. & Oates, p. 65 (part).

Vernacular names. *Tachan-kuruvi* (Tam.).

Description. Differs from the typical form in having the upper parts more olive, less golden, making these parts appear decidedly darker; it perhaps, on an average, also has more crimson on the back. It is a much smaller bird.

Colours of soft parts as in the other races.

Measurements. Wing 145 to 172 mm., nearly always under 160 mm., average 157 mm.; tail 78 to 91 mm.; tarsus 29 to 30 mm.; culmen 38 to 45 mm.

Distribution. India South of Bombay City and the Province of Orissa. I cannot separate this race from birds from Peninsular Burma and Siam and Malaya, which have been named *indomalayicus* by Hesse and *chersonesus* by Kloss.

Nidification. In the Nilgiris and hills of Southern India this race breeds during December, January and February and Howard Campbell also took eggs in March near Ooty. According to Davison and Darling they excavate their nest-holes at any height from 6 to 60 feet and, when not breeding, continue to use the holes as roosting-places at night.

Hopwood took eggs of this bird at Tharrawaddy in May.

They seem to lay from one to three eggs, only differing from those of the other races in being smaller, averaging about 28·3× 20·5 mm.

Habits. Those of the species.

(1407) Chrysocolaptes guttacristatus stricklandi.

LAYARD'S WOODPECKER.

Brachypternus stricklandi Layard, Ann. Mag. Nat. Hist., xiii, p. 449 (1854) (Ceylon).
Chrysocolaptes stricklandi. Blanf. & Oates, iii, p. 67.

Vernacular names. *Kérellā* (Cing.); *Maran-kotti*, *Tachan-kuruvi* (Tam.).

Description. Similar to *C. g. guttacristatus* but with the whole back crimson and the wings rather duller crimson instead of golden or bronze-yellow. The black on the head is greater, and the white less, in extent.

Colours of soft parts. Iris yellowish-white, yellow, buff or buff with an outer reddish ring. Bill horny-brown or plumbeous-brown at the base, paling towards the tip, where it is almost white and tinged with green in the centre; legs and feet dull greenish-brown or greenish-slate.

Measurements. Wing 142 to 150 mm.; tail 90 to 95 mm.; tarsus 30 to 31 mm.; culmen 42 to 45 mm.

Distribution. Ceylon only.

Chrysocolaptes stricklandi is undoubtedly a representative form of *C. g. guttacristatus* and Wait informs me that he has seen specimens showing a transition from the golden-backed to the crimson-backed coloration, although these are not so common as they are in the *Brachypternus* group. It seems advisable, therefore, to retain *stricklandi* as a subspecies of *guttacristatus*.

Nidification. Wait remarks: "It would appear to have much the same nesting-habits as *C. festivus*. The first brood is hatched early in the year, and I once found an addled egg with two young ones in September. Oftener only one egg is laid."

Three eggs in my own collection taken in February measure 30·5 × 19·8, 28·2 × 20·4 and 29·3 × 20·4 mm.

Habits. Of all the races of *guttacristatus* this one is the most strictly confined to forest, though Wait notes that in the wilder districts it sometimes visits large trees in gardens. Its flight, he says, is more rapid than that of *Brachypternus* and the note is a thin, shrill trill.

Genus HEMICIRCUS.

Hemicircus Swainson, Class. B., ii, p. 306 (1837).

Type, *Hemicircus concretus* Temm.

A genus of small Woodpeckers. Bill straight, compressed towards the end; nasal ridge well developed, about half-way between culmen and commissure and extending over about half the length of the bill; nostrils covered with plumes; feet large, the hallux well developed; fourth toe longer than third; a long occipital crest; tail very short, hardly exceeding the coverts, the feathers rounded and very slightly graduated.

Both races possess a tuft of bristly feathers in the middle of the back, smeared with a curious resinous-smelling secretion.

Key to Species.

A. Crown crimson in males, olive-grey in females, ruddy buff in young ..... *H. concretus*, p. 82.
B. Crown black with white specks in male, buff in females and young ..... *H. canente*, p. 83.

Hemicircus concretus.

Picus concretus Temm., Pl. Col., pl. xc, figs. 1, 2 (1824).

Type-locality: Java.

The typical form differs from that found in the Malay Peninsula in having the whole crest crimson, whilst the Bornean form, *H. c. brookeanus*,* differs in being much darker and browner below, the posterior flanks, abdomen and under tail-coverts having no yellow tinge.

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* *Hemicercus brookeanus* Salvadori, Atti R. Ac. Sci. di Tor., iii, p. 325 (1868): Sarawak, Borneo.

(1408) Hemicircus concretus sordidus.

THE GREY-AND-BUFF WOODPECKER.

Dendrocopus sordidus Eyton, Ann. & Mag. Nat. Hist., xvi, p. 229 (1845) (Malacca).
Hemicercus sordidus. Blanf. & Oates, iii, p. 68.

Vernacular names. None recorded.

Description.—Male. Forehead, crown and anterior crest crimson; lores, supercilium, sides of head, neck and long occipital crest dark olive-grey, a buff patch on the back of the nape, more or less concealed by the crest; back, scapulars, wing-coverts and inner secondaries black with bold edges of white, creamy-white or buffy-white and a bar near the base of the feathers; lower back grey, rump buff; upper tail-coverts black tipped with buff; tail black, the outer feathers tipped with buff; primary-coverts black; primaries and outer secondaries black, edged with buff on the inner webs; lower plumage olive-grey, the posterior flanks and abdomen lighter and more green with buff or yellowish-olive edges; under tail-coverts black with white tips.

Colours of soft parts. Iris red-brown to red; bill horny-plumbeous or plumbeous-grey; legs and feet dull greenish-plumbeous.

Measurements. ♂, wing 85 to 88 mm.; tail 25 to 32 mm.; tarsus 18 to 19 mm.; culmen 18 to 22 mm.: ♀, wing 80 to 85 mm.

Female. Crown, crest and nape grey like the rest of the head.

Young birds of both sexes have the crown and crest buff, the longer feathers tipped with crimson.

Nestlings and very young birds have the feathers of the crown and crest tipped with olive and with practically no crimson tinge at all; the underparts barred throughout with buff.

Distribution. The whole of the Malay Peninsula, straggling into the South of Tenasserim, where Davison obtained a single abnormally pale buff-coloured young male.

Nidification. Unknown.

Habits. This is one of those birds which many orinthologists have collected as skins, recording minute details of colour and dimensions but ignoring all field-notes, habits, nature of habitat and characteristics of the live bird.

Hemicircus canente.

Key to Subspecies.

A. Larger. Wing (♂) nearly always over 95 mm.; culmen over 20 mm. ..... *H. c. canente*, p. 84.
B. Smaller. Wing (♂) nearly always under 95 mm.; culmenunder 20 mm. ..... *H. c. cordatus*, p. 85.

(1409) Hemicircus canente canente.

THE HEART-SPOTTED WOODPECKER.

Picus canente Less., Cent. Zool., p. 215 (1830) (Pegu).
Hemicercus canente. Blanf. & Oates, iii, p. 69 (part).

Vernacular names. None recorded.

Description.—Male. Upper parts of the head black, the forehead and crown but not the crest minutely speckled with white; hind-neck, back and scapulars black; rump white or buffy-white; upper tail-coverts black, the shorter edged with buffy-white; tail black; inner wing-coverts and innermost secondaries buff with broad heart-shaped black bands; remaining coverts black, more or less narrowly edged with buff; shoulder of wing and under wing-coverts buff; quills brownish-black; chin, throat, sides of neck

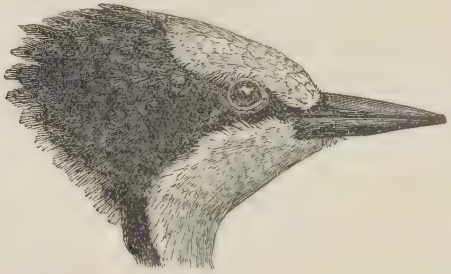

Fig. 12.—Head of *H. c. canente*.

and base of hind-neck buffy-white; fore-neck, breast, and abdomen dark olive, changing to black on the posterior flanks, vent and under tail-coverts, the latter narrowly edged with white.

Colours of soft parts. Iris dark reddish-brown; bill black; legs dull plumbeous or blackish-green, sometimes almost black.

Measurements. Wing, ♂ 94 to 103 mm., ♀ (89 one) 92 to 98 mm.; tail 28 to 31 mm.; tarsus 17 to 19 mm.; culmen, ♂ 20 to 25 mm., ♀ 19 to 21 mm.

Female. Differs from the male only in having the forehead and anterior crown buff or buffy-white and in having more buff or buffy-white on the wings.

Young birds are like the females but much darker below, birds when they first leave the nest being a blackish-brown or chocolate with no tinge of olive.

Distribution. Assam, South of the Brahmaputra, through Burma and the greater part of the Malay Peninsula, East to Siam, Cochin China and Annam.

Nidification. This little Woodpecker breeds in Cachar from February to April; in the South of Burma it commences to breed

in the end of November but, on the other hand, Darling obtained fresh eggs as late as the 2nd July. It probably lays twice in the year. The tree or stump selected for the nest-chamber may be one either in thin forest, bamboo- and scrub-jungle or in more open country, occasionally even in the open lands immediately in the vicinity of villages. The most favourite place, however, is a dead tree in a clearing in heavy forest. The entrance is generally low down, between five and fifteen feet from the ground, but Davison found one nest in the Salween district about 45 feet up and another taken by myself in Cachar was certainly 35 feet from the ground. The eggs number two or three, sometimes only one and measure about 25·0 × 18·1 mm.

Habits. The Heart-spotted Woodpecker is found both in forest and open country, but not in the former if very dense and not in the latter unless well wooded. In the North it is a bird of the plains and lowest hills under 1,000 feet but in the hills of Lower Burma it is found up to about 3,000 feet or more. The only note I have heard is a shrill, but for a Woodpecker, not unpleasant, chattering cry as it flies from one tree to another. It keeps much to the higher branches of tall trees when feeding and is generally found in pairs.

(1410) Hemicircus canente cordatus.

THE MALABAR HEART-SPOTTED WOODPECKER.

Hemicercus cordatus Jerdon, Madr. Journ. Lit. Sci., xi, p. 211 (1840) (Malabar).
Hemicercus canente. Blanf. & Oates, iii, p. 69 (part).

Vernacular names. None recorded.

Description. Differs from *H. c. canente* only in being rather smaller and in having much smaller bills sex for sex in the adults. Young birds seem to have strikingly smaller bills than old ones.

Colours of soft parts as in the preceding bird.

Measurements. Wing, ♂ 90 to 96 mm., ♀ 89 to 95 mm.; culmen, ♂ 18 to 20 mm., ♀ 17 to 19 mm.

Distribution. The coast of Malabar and Travancore. Jerdon's record of this little Woodpecker in the Central Provinces has never been confirmed and is possibly due to some mistake. Laird obtained it in North Kanara.

Nidification. Very little on record. Stewart found it breeding in Travancore from January to March and Bourdillon also found it breeding in February. It makes its tunnel in a dead branch of a tree at a considerable height from the ground and generally, if not always, selects a tree standing in forest. Eight eggs average about 23·5 × 18·6 mm.; but one of the clutches is abnormally broad.

Habits. Apparently this race is more entirely a forest bird than its Eastern relation, otherwise the habits of the two are very similar. It is found in the hills up to about 4,000 feet.

Genus MULLERIPICUS.

Mulleripicus Bonaparte, Consp. Volucr. Zygod., p. 7 (1854).

Type, *Picus pulverulentus* Temm.

This genus contains a single species of very large size with no crest but with the feathers of the crown short and scaly; the bill is large, slightly curved at the base and then straight; the nasal ridge is well marked and extends almost to the tip; the nostrils are large, round and covered by stiff plumes; hallux well developed, the fourth toe shorter than the third; tail-feathers long and very rigid, the outermost pair just exceeding the upper tail-coverts in length.

Mulleripicus pulverulentus.

Picus pulverulentus Temm., Pl. Col., 389, ♂ (1826).

Type-locality: Java.

The typical form differs from the Indian form in being much darker.

(1411) Mulleripicus pulverulentus harterti.

THE INDIAN GREAT SLATY WOODPECKER.

Mulleripicus pulverulentus harterti Hesse, Orn. Monatsb., p. 182 (1911) (Assam).
Hemilophus pulverulentus. Blanf. & Oates, iii, p. 71.

Vernacular names. *Daoja gadaiya-gadeba* (Cachari).

Description.—Male. A short broad malar streak crimson; chin, throat and fore-neck buffy-yellow, palest on the chin and often tinged with crimson on the fore-neck; remainder of plumage ashy slate-grey, palest on the head, where each feather is tipped with tiny spots of paler grey; feathers of breast occasionally obsoletely marked in the same manner. The red on the throat may possibly be breeding plumage only, as it was much less marked in all my Winter specimens killed in Cachar.

Colours of soft parts. Iris dark hazel-brown or red-brown; bill pale slaty-white, sometimes tinged with blue, the culmen and tip blackish; legs dark slaty, sometimes tinged with blue, more rarely with green.

Measurements. Total length about 500 mm.; wing 221 to 245 mm.; tail 134 to 162 mm.; tarsus about 39 to 41 mm.; culmen 30 to 69 mm.

Female. Wants the red moustachial stripe but is otherwise similar to the male.

Young birds are similar to the female but darker and duller slate with the lower plumage more profusely spotted with pale dots.

Distribution. The Terai, Oudh to Eastern and South Assam; Manipur, practically the whole of Burma and the Malay Peninsula to the extreme South; Siam, Annam and Cochin China. It has also been recorded from as far West as Simla.

Nidification. Bingham found the first nest ever taken of this bird situated in an enormous fallen tree which formed a bridge over a stream crossed by a deserted village track. Since then it has been taken in N. Cachar and in the Lower Chindwin. The nest-hole is most often excavated in the great diseased swellings which occur in the branches of the *Bombax malabarica* and at an enormous height from the ground; sometimes they are bored in dead trees between twenty and thirty feet up and, once, I found a nest in a huge dead tree only three feet above the roots. The entrance is about four inches in diameter and when one of the swellings above referred to is chosen opens straight into the chamber. In dead trees the tunnel may be as much as three feet. The eggs number two to four and are typical Woodpeckers' except for their immense size. Eight eggs average 36·2×28·6 mm.: maxima **43·2×35·0** mm. (perhaps abnormally large); minima **32·0**×28·0 and 34·4×**27·4** mm.

Habits. This magnificent Woodpecker frequents in preference deciduous forest and park-like country with trees scattered in clumps and singles. It is also sometimes to be seen in very dense evergreen forest between the foothills and about 3,000 feet. It remains throughout the year in small parties numbering four to six, rarely up to ten, the members of which follow one another at intervals from the top of one tall tree to another, screaming as they go with very loud raucous cries. Their flight is very heavy, laboured and dipping, their wings making a great noise and the birds always fly very high, in forest well above the tallest trees. In temperament they vary greatly, being sometimes very wild, sometimes very tame, but they are always very hard to drive away permanently from any favourite feeding-ground. The noise of their tapping when feeding is very peculiar. It starts with slow, very resonant taps, which get faster and faster, finishing off with a series of rolling reverberations which can be heard at a great distance.

Genus **THRIPONAX.**

Thriponax Cab. & Hein., Mus. Hein., iv, p. 105 (1863).

Type, *Picus javanensis* Horsf.

This genus differs from *Mulleripicus* in having a well-developed nuchal crest and the feathers of the crown normal; the bill is rather smaller than in the preceding genus, the nostrils similar

but the nasal ridge a little further from the culmen, though still nearer to it than to the commissure.

Key to Species.

A. Abdomen white	*T. javanensis*, p. 88.
B. Abdomen black	*T. hodgei*, p. 91.

Thriponax javanensis.

Key to Subspecies.

A. Rump black, or with practically no white showing	*T. j. javanensis*, p. 88.
B. Rump broadly white.	
a. Primaries black throughout or nearly so	*T. j. hodgsoni*, p. 89.
b. Primaries with the inner webs broadly white at the base	*T. j. feddeni*, p. 90.

(1412) Thriponax javanensis javanensis.

THE MALAY BLACK WOODPECKER.

Picus javanensis Ljung, K. Vet. Ac. Nya Handl., xviii, p. 137 (1797) (Java).
Thriponax javensis. Blanf. & Oates, iii, p. 74.

Vernacular names. None recorded.

Description.—Male. Forehead, crown, nape and the whole of the lower portions of the cheeks crimson; lower breast, abdomen, flanks and axillaries white or creamy-white; the chin, throat and fore-neck flecked with white; thighs and posterior flanks white with black centres to the feathers; remaining plumage glossy black.

In every specimen there is a considerable amount of white on the inner webs of the inner primaries and outer secondaries but the extent varies considerably.

Colours of soft parts. Iris creamy-white to bright yellow; bill dark plumbeous, almost black on the culmen, paler slaty at the base of the commissure and on the gonys; legs and feet dark plumbeous, sometimes with a greenish, sometimes with a bluish tinge.

Measurements. Wing 198 to 230 mm.; tail 120 to 162 mm.; tarsus about 31 to 32 mm.; culmen about 53 to 57 mm.

Female has the forehead and fore-crown black and has no crimson on the cheeks; otherwise as in the male.

Distribution. South Tenasserim and South-West Siam; Malay Peninsula to Borneo, Sumatra, Java and Bali.

Many individuals show traces of white on the rump, proving that this bird, *feddeni* and *hodgsonii* are but geographical races o the same species.

Nidification. A single egg of this bird was taken by Major J. C. Moulton near Sarawak from a hole bored in a dead tree standing in forest. It measures 36·8 × 26·4 mm. and was taken on the 4th of February.

Habits. Said to be a Woodpecker of forest and heavy scrub-jungle mixed with tree-growth, not venturing much into open or cultivated country.

(1413) Thriponax javanensis feddeni.

THE BURMESE GREAT BLACK WOODPECKER.

Mulleripicus feddeni Blyth, J. A. S. B., xxxii, p. 75 (1863) (Pegu).
Thriponax feddeni. Blanf. & Oates, iii, p. 73.

Vernacular names. None recorded.

Description.—Male. Differs principally in having a broad white band across the rump. The crown and nape are scarlet crimson instead of deep crimson, with the bases of the feathers white instead of black; the white on the abdomen and breast more extensive, whilst the white patch at the base of the wing-quills covers from half to two-thirds the under exposed parts of the wings; the primaries are also tipped with white.

Colours of soft parts as in *T. j. javanensis.*

Measurements. Wing 207 to 224 mm.; tail 136 to 151 mm.; tarsus about 33 to 34 mm.; culmen 44 to 50 mm.

Female differs in the same respects as do females of the other races.

Distribution. Burma from the Chin and Kachin Hills and Northern Shan States to North Tenasserim.

Nidification. Cook took the eggs of this fine Woodpecker in Maymyio from a hole excavated in a thorny *Letphan* tree standing in a deserted clearing. The entrance was about 14 feet from the ground and the tunnel large enough for a small boy to put his arm in and reach the eggs, which measured 33·3 × 24·4 and 33·0 × 28·8 mm. A second clutch, taken by Grant at Thamandu, contained three eggs measuring 35·0 × 22·8, 34·3 × 23·0 and 32·1 × 23·2 mm. These also were placed in a hole excavated in a tree standing in a clearing in forest. The two clutches were taken on the 6th February and the 23rd May,

Habits. The Burmese Black Woodpecker is found both in well-wooded open country and in dense forest. Its habits are much the same as those of *Mulleripicus* but it is less constantly seen in flocks and its cries are not so loud or discordant. The sound of its tapping is not reverberatory, as with the Slaty Woodpecker, but consists of loud single blows, slowly repeated. The flight also is noiseless.

(1414) Thriponax javanensis hodgsonii.

THE MALABAR GREAT BLACK WOODPECKER.

Hemilophus hodgsonii Jerdon, Madr. Journ. Lit. Sci., xi, p. 215 (1840) (Telicherry, Malabar coast).
Thriponax hodgsoni. Blanf. & Oates, iii, p. 72.

Vernacular names. None recorded.

Description.—Male. Differs from *T. j. javanensis* only in having a broad white rump. The head, abdomen and wings are as in the typical form but there seems to be even less white on the quills.

Colours of soft parts. Iris crimson; bill black or nearly so, sometimes tinged with plumbeous; legs and feet deep plumbeous or greenish-black.

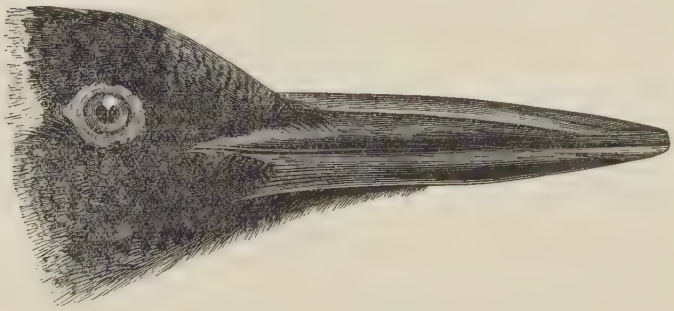

Fig. 13.—Head of *T. j. hodgsonii.*

Measurements. Wing 206 to 220 mm.; tail 147 to 168 mm.; tarsus about 33 to 34 mm.; culmen 52 to 59 mm.

Female differs from the male as in the other races.

Distribution. Travancore to Belgaum, on the Western coast of South India.

Nidification. Breeds commonly in many parts of the Western parts of Southern India and Mr. A. P. Kinloch succeeded in obtaining both young and eggs. He records the nest-holes as being made in tall dead trees at heights varying from 30 to 50 feet from the ground. The entrance hole from its size, about six inches in diameter, is very conspicuous and in addition the birds when excavating strew the ground round the tree with fragments of dead wood. "The birds," he remarks, "are extremely shy and impatient of observation. If they think that an undue interest is being taken in their movements, they will promptly desert their nesting-site, their eggs and even their

young." He twice found two young in a nest and once two eggs, but Davison, in Kanara, never found more than one young with the parent birds. Kinloch's two eggs measure about 35·6 × 26·0 mm. The breeding months seem to be December to February.

Habits. Kinloch, writing from the Nelliampathy Hills, says :— "These grand Woodpeckers are quite common here. They move about, as a rule, only in the early morning and late evening. They appear always in pairs and call to one another in a curious plaintive metallic clang, which is remotely reminiscent of a Sea-gull's note. They possess a laugh, only uttered in flight."

(1415) Thriponax hodgei.

The Andaman Black Woodpecker.

Mulleripicus hodgei, Blyth, J. A. S. B., xxix, p. 105 (1860) (Andamans).
Thriponax hodgii. Blanf. & Oates, iii, p. 75.

Vernacular names. None recorded.

Description.—Male. Forehead, crown, moustachial streak and nape extending on to sides of neck behind the ear-coverts crimson ; remainder of plumage black, much duller and browner than in any of the races of *javanensis* ; the lower parts are even browner than the upper.

Colours of soft parts. Iris creamy-white to pale bright yellow ; bill plumbeous black, the tip paler and transparent; legs and feet greenish or plumbeous black.

Measurements. Wing 180 to 190 mm. ; tail 130 to 141 mm. ; tarsus 32 to 33 mm. ; culmen about 41 to 47 mm.

Female has only the crest and nape crimson.

Distribution. Andamans only.

Nidification. Osmaston and Wickham found this bird breeding during January and February in forest. The nest-holes are cut out in dead trees at a considerable height from the ground. Either two or three eggs are laid, which vary in size from 31·4 × 23·3 to 36·6 × 24·5 mm.

Habits. The Andaman Black Woodpecker frequents high tree-forest, hunting for its food on the higher branches of the bigger trees. Osmaston says that the sound of its resonant tapping can be heard at a distance of half-a-mile.

Subfamily PICUMNINÆ.

This subfamily consists of a large number of very small Woodpeckers, distinguished by their soft, short tail-feathers and by certain anatomical differences from the previous subfamily. They are found principally in South America but extend to Africa and Asia, two species being found within Indian limits.

Key to Genera.

A. Toes four; orbital region feathered .... PICUMNUS, p. 92.
B. Toes three; orbital region naked ..... SASIA, p. 95.

Genus PICUMNUS.

Picumnus Temm., Pl. Col., livr. 62 (1825).

Type, *Picumnus minutus* Linn. Brazil.

The bill in this genus is conical, compressed and pointed, the wedge-shape tip to the upper mandible being just discernible; the nostrils and chin-angle are concealed by dense plumes with black bristles projecting beyond; wings and tail rounded; toes four; orbits feathered; body plumage soft, lax and lengthened.

Picumnus innominatus.

Key to Subspecies.

A. Upper parts brighter, more tinged with orange; the head paler and tinged with green ..... *P. i. innominatus*, p. 92.
B. Upper parts duller, with less orange tint; head darker and more grey.
a. Paler; head more grey, with no spots.. *P. i. malayorum*, p. 94.
b. Darker; head more brown, spotted black ..... *P. i. avunculorum*, p. 94.

(1416) Picumnus innominatus innominatus.

THE HIMALAYAN SPECKLED PICULET.

Picus innominatus Burton, P. Z. S., 1836, p. 154 (Himalayas: restricted to Sikkim).
Picumnus innominatus. Blanf. & Oates, iii, p. 76 (part).

Vernacular names. *Wi-wi* (Nepal); *Dang-chim* (Lepcha); *Daoja-gadaiya tiriling* (Cachari).

Description.—Male. Nasal plumes yellowish-white; bristles of chin and plumes black; forehead olive, sinciput bright orange, the feathers based with black; hind crown and nape olive; back, scapulars, rump and upper tail-coverts orange-olive; tail black, the inner webs of the middle tail-feathers white, the three outer pairs with a broad subterminal white, or yellowish-white, bar; a

broad white or yellow supercilium from behind the eye widening on the sides of the neck; ear-coverts and sides of neck dark olive-brown; a second line of the same colour from the bill down the sides of the neck; intermediate area white or yellowish-white; lower plumage pale yellow, whiter on the chin and throat, with bold black spots, lengthening into bars on the posterior flanks and vent; under wing-coverts yellowish-white.

Colours of soft parts. Iris brown or red-brown; bill dark slaty-black or plumbeous, paler at the tip; legs dull plumbeous.

Measurements. Total length about 100 mm.; wing 56 to 60 mm.; tarsus about 11 to 12 mm.; culmen about 10 to 11 mm.

Female only differs from the male in having the whole crown olive.

Young birds are like the female but very dull in colour.

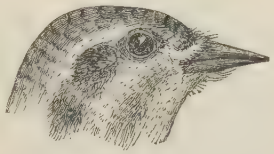

Fig. 14.—Head of *P. i. innominatus*.

Distribution. Kuman to Eastern Assam. Some birds from Assam South of the Brahmapootra and from Manipur somewhat approach the Malayan form but, on the whole, are nearer the typical one whilst the majority are quite indistinguishable from it.

Nidification. This Little Piculet breeds in the Western Himalayas in April and May and in the Eastern ranges up to the end of June and, very rarely, in July. They keep almost entirely to small trees in the Kuman, excavating their tiny entrances and tunnels both in branches and in the trunks. In Assam three out of every four nest-holes are made in dead bamboos or in living bamboos, which have decayed in part. The eggs number two to four hard, glossy white little eggs, in shape either spherical or obtuse ovals. Twenty-five eggs average 14·8 × 12·0 mm.: maxima **16·2** × 12·5 and 15·0 × **13·0** mm.; minima **13·3** × 12·2 and 14·3 × **10·9** mm.

Habits. This Woodpecker is found from the foothills and the adjacent plains up to at least 4,000 feet throughout its range, whilst from the Western limits to Bhutan it occurs up to 6,000 feet as a constant resident and has been recorded by Stolickza as high as 9,000 feet. In Cachar and the Khasia Hills it occurs but rarely much over 4,000 feet. It frequents any kind of forest or jungle but in the West prefers the forest- and scrub-jungle and in the East bamboo-jungle or secondary growth. In its general habits it is a typical little Woodpecker, clambering about the smaller trees

and bamboos from the lower parts to the tops and then launching out from thence to the bottoms of others; the flight is typical but quicker and less dipping than in most birds of this group and its cry is a quaint little piping imitation of that of its larger brethren. It never, I believe, feeds actually on the ground but I have seen it on fallen bamboos and it is very partial to hunting fallen trees for ants and larvæ.

(1417) Picumnus innominatus malayorum.

THE MALAY SPECKLED PICULET.

Picumnus innominatus malayorum Hartert, Vög. Pal., iii, p. 937 (1912) (Perak).
Picumnus innominatus. Blanf. & Oates, iii, p. 76 (part).

Vernacular names. None recorded.

Description. Both sexes differ from the preceding bird in having the upper parts duller with much less orange tint; the head is darker and more brown, whilst the underparts are much less yellow, the pale parts being almost white.

Colours of soft parts the same in all three races.

Measurements. Wing 55 to 59 mm.; culmen 10 to 12 mm.

Distribution. Borneo, Sumatra, Malay Peninsula, Eastern Burma, in the Karen Hills, on the Thoungyeen River and in the South Shan States; Annam; Koontan in Northern Siam.

Nidification. Nothing recorded.

Habits. Similar to those of the Himalayan form.

(1418) Picumnus innominatus avunculorum.

THE NILGIRI SPECKLED PICULET.

Picumnus innominatus avunculorum Hartert, Vög. Pal., iii, p. 917 (1912) (Nilgiris).
Picumnus innominatus. Blanf. & Oates, iii, p. 76 (part).

Vernacular names. None recorded.

Description. Both sexes very like *P. i. malayorum* but still duller and darker, especially on the crown, where there are blackish centres to a few of the feathers; the ear-coverts and streaks on the sides of the head and neck are very dark and the spots on the lower plumage also larger than in the other races.

Colours of soft parts as in the other races.

Measurements. Wing 60 to 61 mm.; tail 33 to 35 mm.; tarsus about 12 mm.; culmen about 12 mm.

Distribution. Nilgiri and Wynaad Hills, Agrore. Stewart and Bourdillon both obtained it in the Travancore Hills.

Nidification. Unknown.

Habits. Apparently a rare bird about which very little is known. It keeps more to the forest than the preceding races and is comparatively more often seen on high trees on the upper branches.

Genus **SASIA**.

Sasia Hodgs., J. A. S. B., v, p. 778 (1836).

Type, *Sasia ochracea* Hodgs.

The genus *Sasia* differs from *Picumnus* in wanting the first, or inner hind, toe and in having a naked space round the eye; the tail is still shorter than in that genus and the culmen slightly more rounded.

Key to Species.

A. A white stripe running back from above the eye ..... *S. ochracea*, p. 95.
B. No white stripe ..... *S. abnormis*, p. 98.

Sasia ochracea.

Key to Subspecies.

A. Darkest above; underparts deep ferruginous ..... *S. o. ochracea*, p. 95.
B. Intermediate in colour above; underparts bright ferruginous ..... *S. o. querulivox*, p. 96.
C. Palest above; underparts orange-rufous .. *S. o. reichenowi*, p. 97.

(1419) **Sasia ochracea ochracea.**

THE INDIAN RUFOUS PICULET.

Sasia ochracea Hodgs., J. A. S. B., v, p. 777 (1836); Blanf. & Oates, iii, p. 77.

Vernacular names. *Sasya* (Nepal); *Chim*, *Chin-pho* (Lepcha).

Description.—Male. Forehead rufescent gold; crown and nape olive; lores dark grey, the bristles of the face black; a short, broad white supercilium from above the eye to the end of the ear-coverts; back, scapulars and rump deep rufous, tinted with olive, especially on the back; upper tail-coverts and tail black; wing-coverts olive, the edge of the wing rufous-white; primaries brown, the outermost edged with white; secondaries brown edged with olive-yellow and the innermost wholly rufous-olive; lower plumage rich deep rufous, sometimes paler on the chin.

Colours of soft parts. Iris crimson-brown to crimson; orbital skin crimson in the male, reddish in the female; upper mandible blackish, fading to pale plumbeous at the tip, lower lead-colour, white at the tip; legs red, yellowish-red, dull orange or greenish-brown.

Measurements. Total length about 100 mm.; wing 54 to 57 mm.; tail 23 to 25 mm.; tarsus about 12 to 13 mm.; culmen about 12 to 13 mm.

Female. Similar to the male but with the forehead almost concolorous with the crown.

Distribution. Garhwal, Nepal, Sikkim East to Dibrugarh in Assam, North of the Brahmapootra. Birds from the Kauri Kachin Hills are identical with the typical form.

Nidification. This quaint little Woodpecker breeds from the lowest foothills of the Himalayas up to about 6,000 feet but is most common between the foothills and 3,000 feet. Hume had an egg sent from Sikkim taken at 4,000 feet and Gammie also found a nest-hole containing eggs at this elevation, whilst Coltart and I found it common at Margherita at 500 and 1,500 feet. All the nest-holes recorded except one taken by Gammie were made in bamboos in exactly the same manner as that of the next bird. The eggs, as far as is recorded, number three, and twelve of these average 15·9 × 12·7 mm.: maxima **17·0** × 12·9 and 16·0 × **13·0** mm.; minima **14·9** × 12·6 and 15·0 × **12·4** mm.

Habits. Exactly the same as those of the next race. Stevens found it common in dense swampy forest in N. Lakhimpur but in Margherita it kept almost entirely to scrub-jungle, bamboos, dense reeds or light secondary growth

(1420) Sasia ochracea querulivox.

THE CACHAR RUFOUS PICULET.

Sasia ochracea querulivox Stuart Baker, Bull. B. O. C., lxvii, p. 43 (1926) (Tipperah).
Sasia ochracea. Blanf. & Oates, iii, p. 77 (part).

Vernacular names. *Dao jagadaiya kashiba gajao* (Cachari).

Description. Not nearly so dark as *S. o. ochracea*; above more rufous and less olive and below much less deep a rufous; the lores are generally a paler grey; the point of the chin is usually grey and the throat sometimes paler.

Colours of soft parts. Irides crimson to crimson-brown; orbital skin bright crimson in the male in breeding-season, at other times dull red as in the female; upper mandible dark slaty to black, changing to pale plumbeous at the tip, lower mandible paler lead-colour, almost white at the tip; legs and feet red, yellowish-red, dull orange or greenish-red.

Measurements. Total length 95 to 100 mm.; wing 51 to 56 mm.; tail 22 to 23 mm.; tarsus about 12 mm.; culmen about 12 to 13 mm.

Distribution. Assam South of the Brahmapootra, Manipur, Hill Tippera and Chittagong in Eastern Bengal, Chin Hills in the extreme North-West of Burma.

SASIA OCHRACEA QUERULIVOX, 4/5
The Cachar Rufous Piculet.

Nidification. The Cachar Rufous Piculet breeds at all heights up to 6,000 feet but is more common below 4,000 feet and is sometimes found breeding in the Plains. Occasionally it makes its nest-hole in the branch of a tree but in nine cases out of ten it makes use of a bamboo for this purpose. A curious, but very favourite, site is a dead bamboo which has been cut down but left hanging in the clump, caught up in the other bamboos, from which it swings free in the wind. The nest-hole is bored just below a node and the eggs are deposited on the node below, over which there is nearly always a mass of dust and tiny particles of bamboo. The eggs number two to four, generally three, and are either very spherical or obtuse ovals; the shells are glossy and fine and the texture very stout for such tiny eggs. Forty eggs average 15·3 × 12·2 mm.: maxima **16·7** × 12·5 and 15·4 × **12·9** mm.; minima **14·0** × 12·0 and 14·4 × **11·5** mm.

The principal breeding month is May but they lay from early April to the end of June.

Habits. The Cachar Rufous Piculet may occasionally be found in forest but its favourite resorts are bamboo-jungle, scrub, thin secondary growth or coarse reeds. It is a restless little bird, even for a Woodpecker, and in addition to energetic climbing, constant tapping and search for its insect prey, has a curious habit of making fluttering little flights of a few yards and then returning to its original hunting-ground. Its ordinary flight is typically that of a *Picus* but straighter and less dipping than most, whilst its voice is a querulous miniature of that of its larger brethren and is uttered both in flight and when climbing. Like the stiff-tailed Woodpeckers the Piculets cannot climb backwards and, like them also, they almost invariably climb spirally. Their food consists of larvæ and coleoptera principally and they hunt elephant-grass and ekra for a small beetle which hides between the bases of the leaves and the stalks. They are not shy birds and do not seem to resent being watched.

(1421) Sasia ochracea reichenowi.

THE BURMESE RUFOUS PICULET.

Sasia ochracea reichenowi Hesse, Orn. Monatsb., xix, p. 181 (1911) (Burma).
Sasia ochracea. Blanf. & Oates, iii, p. 77 (part).

Vernacular names. None recorded.

Description. Much paler than the preceding form, with still less olive tinge above and with lower plumage and rump a bright golden-rufous.

Colours of soft parts. Iris bright crimson; orbital skin dark crimson-lake; upper mandible dark horny-brown, lower mandible pale bluish; legs and feet dull orange-red (*Davison*).

Measurements. About the same as those of *S. o. querulivox*; wing 51 to 55 mm.

Distribution. Burma from the Lower Chindwin, Tounghoo, South Shan States to Mergui and Ye in Tenasserim, Annam.

Nidification. Unknown.

Habits. Those of the species.

(1422) Sasia abnormis.

TEMMINCK'S RUFOUS PICULET.

Picumnus abnormis Temm., Pl. Col., iv, pl. 371 (1825) (Java).

Vernacular names. None recorded.

Description.—Male. Forehead golden-rufous; crown, nape, hind-neck, back, scapulars, wing-coverts and innermost secondaries dark golden-olive, darkest on the crown; rump orange-rufous; upper tail-coverts olive; tail black; greater primary-coverts and closed portions of wing-quills dark brown; lores and short supercilium rufous, more or less marked with crimson; sides of the head and neck and lower parts deep rufous, an indefinite band of golden-yellow below the breast.

Colours of soft parts. Similar to those parts in the preceding species.

Measurements. Wing 50 to 54 mm.; tail about 22 mm.; tarsus about 12 mm.; culmen about 11 to 12 mm.

Female. Similar to the male but with the forehead duller rufous.

Distribution. Java, Borneo, Sumatra, Malay Peninsula and South-West Siam, North-West as far as Maprit. I have also received eggs with one of the parent birds from near Ye in Tenasserim.

Nidification. Unrecorded. The eggs sent me from Ye were laid in a bamboo and are just like those of *S. o. ochracea*

Habits. Those of the genus.

Subfamily IYNGINÆ.

Tail-feathers soft and flexible; tail about three-quarters the length of the wing or more; nostrils not covered with plumes but partly covered by a membrane; bill pointed and compressed and of moderate length. Sexes alike.

This subfamily contains the Wrynecks, represented in India by a race of the typical form.

Genus IYNX.

Jynx Linn., Faun. Suec., No. 97 (1746).

Type, *Jynx torquilla* Linn.

Characters those of the subfamily.

Iynx torquilla.

Key to Subspecies.

A. Paler; underparts not so profusely marked .. *I. t. torquilla*, p. 99.
B. Darker; underparts more profusely marked .. *I. t. japonica*, p. 100.

(1423) Iynx torquilla torquilla.

THE EUROPEAN WRYNECK.

Jynx torquilla Linn., Syst. Nat., 10th ed. i, p. 112 (1758) (Sweden).
Iynx torquilla. Blanf. & Oates, iii, p. 78 (part).

Vernacular names. *Gardan eyengtha* (Hind.); *Meda nulingadu* (Tam.).

Description. Above pale grey, finely vermiculated with grey-brown, some of the feathers with apical white spots and subapical ones of black; a patch running from the nape to the lower back consisting of three longitudinal broken black bands with the intermediate and broken spaces more rufous than the rest of the upper parts; wing-coverts like the back but the spotting more pronounced; primaries and outer secondaries grey, with rufous bands on the outer and spots on the inner webs; inner secondaries like the back, with broad black central streaks and double pale rufous spots at the tips; sides of the head, chin, throat and upper breast pale rufous with narrow black bars; remainder of lower parts whitish with black arrow-head markings, scanty and often absent on the centre of the abdomen; the flanks and under tail-coverts tinged with rufous.

The variation in depth of colouring is very great, as is the extent of rufous on the lower parts.

Colours of soft parts. "Iris hazel; bill, legs and feet pale brownish horn-colour" (*Witherby*).

Measurements. Total length about 200 mm.; "wing 83 to 91 mm.; tail 61 to 71 mm.; tarsus 19 to 20 mm.; culmen *from skull* 14·5 to 17·0 mm." (*Witherby*).

Young birds are like the adult but the grey of the upper parts paler and the barring on the lower parts less bold.

Distribution. Spain, Northern Europe to West Siberia and Turkestan; wintering in Northern Africa, South Europe and East and South to the greater part of India but principally on the Western side and in Southern India.

Nidification. The Wryneck breeds during May and June, laying its eggs in small natural hollows in trees or, less often, in holes in banks such as deserted burrows of Sand-Martins. It lays six to ten eggs, occasionally twelve to fourteen, which are pure white, of a soft though close texture and not hard and glossy as in the eggs of the *Picidæ*. "One hundred eggs average 20·4 × 15·3 mm.: maxima **22·5** × 15·5 and 21·5 × **16·5** mm.; minima **17·5** × 14·5 and 19·0 × **14·0** mm." (*Jourdain*).

Habits. Frequents trees, which it hunts for insects in the same manner as the Woodpeckers do but, unlike these birds, it can run backwards and downwards with facility. It prefers trees in well-wooded open country to forests but is seen in the latter also. Its flight is slow and very dipping and it appears loath to take flights of any great distance under ordinary circumstances. Its note is a loud, rapidly-repeated squeak which is constantly uttered. Its food consists largely of ants and it is said to hunt often for them on the ground.

(1424) Iynx torquilla japonica.

THE JAPANESE WRYNECK.

Iynx japonica Bonap., Consp. Av., i, p. 150 (1850) (Japan).
Iynx torquilla. Blanf. & Oates, iii, p. 78 (part).

Vernacular names. *Gardang eyengtha* (Hind.); *Meda nulingadu* (Tam.); *Dao-gogui* (Cachari).

Fig. 15.—Head of *I. t. japonica*.

Description. Differs from the preceding race only in being rather darker and more profusely spotted below.

Colours of soft parts as in *I. t. torquilla*.

Measurements. Wing 82 to 88 mm.; culmen 13 to 14 mm.

Distribution. Breeding from Japan through Manchuria and Central Asia as far West as Baluchistan, Gilgit and North Kashmir. In Winter South to South China, Burma and the greater part of Eastern India as far South as Madras.

Hartert assigns the birds breeding in Gilgit and Kashmir to this race, I think quite correctly, as they are invariably heavily spotted below and rather darker above than *I. t. torquilla*. The two races are, however, very difficult to determine.

Nidification. This race of Wryneck breeds in Manchuria in May and June, during which months Smirnoff took several nests; Col. A. R. Wilson took a nest with eight eggs in June at Sonamarg in Kashmir, in which country Brooks had already reported it as breeding and, finally, Whitehead took a nest at 12,300 feet at Bulta Kundi, Kurram Valley, on the 20th of the same month. It generally selects trees in orchards or in fairly open grass-land, laying its eggs in natural hollows with no nest beyond the rubbish

which has collected in them. The eggs number eight in every nest recorded of this bird but doubtless it lays from six to twelve on occasions. Thirty-two eggs average 21·3 × 15·7 mm.: maxima **22·6** × 15·4 and 22·1 × **16·5** mm.; minima **20·1** × 15·6 and 20·3 × **14·7** mm.

Habits. In Summer the Japanese Wryneck is found between 5,000 feet and the limit of the tree-level along the Himalayas but in Winter it is common in the plains of North-West India, Bihar, Bengal and Assam, occurring as far South as Madras. In its habits it differs in no way from the preceding form and has the same curious habit of twisting its head into most extraordinary positions when feeding, a trait from which the Cacharies give it the name of "the Twisted Bird."

Family CAPITONIDÆ.

In the *Capitonidæ* the bill is proportionately stout and strong, never wedge-shaped but with the culmen curving and the tip pointed, the upper mandible slightly overlapping the lower; the nostrils are basal but nearly always overhung by plumes and bristles, whilst the rictal and chin bristles are also highly developed. The ventral feather-tract is forked on the throat and on each side of the breast. The tail-feathers number only ten and there are also only ten primaries, the first short and the others forming a well-rounded wing.

The palate is ægithognathous, with a tendency towards desmognathism, the clavicles not meeting one another in the middle line to form a furculum; the sternum has a simple spina externa and a double-notched posterior border; the Accessory-femorocaudal thigh-muscle is wanting.

This family is one of very great range, being found over the greater part of the Oriental Region and also in South America, where the two allied families *Galbulidæ* and *Bucconidæ* are also found.

Key to Genera.

A. Prevailing colour brown, not green..... CALORHAMPHUS, p. 102.
B. Prevailing colour green.
a. Lower tail-coverts red ..... MEGALAIMA, p. 104.
b. Lower tail-coverts green.
a'. Second primary shorter than tenth.
a''. Head, neck and breast brown, streaked paler ..... THRERICERYX, p. 108.
b''. Head and neck with bright colours.
a^3. Culmen longer than tarsus .... CHOTORHEA, p. 114.
b^3. Culmen not longer than tarsus . CYANOPS, p. 116.
b'. Second primary longer than eighth.. XANTHOLÆMA, p. 126.

Genus CALORHAMPHUS.

Calorhamphus Lesson, Rev. Zool., 1839, p. 139.

Type, *Bucco hayi* J. E. Gray.

In this genus the bill is stout, the culmen much curved and sharply angulate; the upper mandible not swollen at the base; nostrils overhung but not concealed by feathers and bristles; no bristles on chin; feathers of crown with prolonged bristly shafts; wings rounded, tail slightly round; sexes alike but with differently coloured bills.

Caloramphus fuliginosus.

Micropogon fuliginosus Temm., Pl. Col., iii, text after pl. 490 (1830).

Type-locality: Borneo.

The typical form differs from that which is found in Tenasserim in being much darker and in having the throat and breast brick-red.

(1425) Calorhamphus fuliginosus hayi.

The Brown Barbet.

Bucco hayi Gray, Zool. Misc., p. 33 (1831) (Malacca).
Calorhamphus hayi. Blanf. & Oates, iii, p. 83.

Vernacular names. None recorded.

Description. Above dark brown, the feathers of the head darker and with bristly black shafts and obsolete rufous fringe; the feathers of the mantle with narrow paler edges, which are more conspicuous and yellowish on the rump and upper tail-coverts; wings dark brown, the coverts pale edged and the quills with pale ochre edges to the bases of the inner webs; lores, sides of the head and feathers round the eye brown suffused with crimson brick-red; cheeks paler brown suffused with the same red; lower parts dull white, the chin and throat suffused with red, extending sometimes on to the centre of the breast.

Colours of soft parts. Iris reddish-brown to dull red; bill, ♂ black, ♀ dirty ochraceous-brown, the tip and commissure darker; legs and feet orange (*Davison*).

Measurements. Wing 81 to 88 mm.; tail 47 to 51 mm.; tarsus 21 to 22; culmen 21 to 22 mm.

Distribution. From Sumatra (*Rob. & Kloss*) to South Tenasserim and South-West Siam (*Herbert*).

Nidification. The only eggs taken of this bird were procured by Mr. W. A. T. Kellow near Taiping in the Federated Malay States in February 1910. When cutting clearances in deep evergreen forest several nests were found and in one instance the male bird was caught on the nest and forwarded to me. All the nest-holes were excavated in quite small dead trees and stumps and the favourite site seemed to be the bank of a small stream. Eight eggs average 26·1 × 20·0 mm.: maxima **26·5** × 19·8 and 26·2 × **20·5** mm.; minima **25·0** × **19·6** mm.

Like all Barbets' eggs they are pure soft white, the texture very fine and fairly close but never glossy and hard like the eggs of most Woodpeckers. In shape they are generally long, rather pointed ovals but they probably vary as much in this respect as do those of most Barbets.

Habits. Davison's notes on this bird contain all that is known about it. He writes:—"For a Barbet this species has a most

extraordinary note, a low soft whistle. It is generally found in small parties of three or four, sometimes in pairs and occasionally singly, hunting about the leaves and branches and trunks of trees, peering into every crevice and cranny of the bark, and clinging about in all sorts of positions, far more like a Tit than a Barbet. Its food consists quite as much of insects as of fruit. It is a forest bird. I have never seen it in gardens and, though I have shot so few in Tenasserim, I have had ample opportunities of watching it further South."

Genus **MEGALAIMA.**

Megalaima Gray, List Gen. B., App., p. 12 (1842).

Type, *Megalaima marshallorum* Swinh.

This genus differs from the preceding in coloration pattern and in having long rictal bristles; the bill is large, swollen at the base, whilst the culmen is rounded and not angulate; the nostrils are completely covered with plumes and bristles and the base of the bill is completely surrounded by bristles of moderate length; the wings are rounded but the tail square; sexes alike.

Megalaima virens.

Key to Subspecies.

A. Colour of head distinctly greenish .... *M. v. viren* p. 104.
B. Colour of head blue with no green tinge.
  a. Paler generally; streaks on hind-neck well developed ..... *M. v. marshallorum*, p. 106.
  b. Darker and more richly coloured; pale streaks on hind-neck few..... *M. v. magnifica*, p. 107.

(1426) Megalaima virens virens.

The Great Chinese Barbet.

Bucco virens Bodd., Tabl. Pl. Enl., p. 53 (1783) (China).
Megalæma virens. Blanf. & Oates, iii, p. 86.

Vernacular names. None recorded.

Description. Whole head and neck black, each feather edged with greenish-blue, making these parts look the latter colour; back and scapulars deep maroon-brown turning to brownish-green on the lower back and to grass-green on the rump, upper tail-coverts and tail, the latter with black shafts and under surface black washed with blue-green; a few pale white or blue streaks sometimes present on the upper back; lesser and median coverts like the back; greater coverts dark green, generally suffused and tipped with ruddy-brown; visible primary-coverts greenish-blue; outer primary black, other primaries black edged with grey on the

terminal halves of the outer webs and bright greenish-blue on the basal halves of the outer webs; secondaries brown, green on the outer webs, the inner green on both webs and the innermost very blue; breast deep maroon-brown, merging into the colour of the throat; lower breast and centre of abdomen blue-green, marked with dusky and pale yellow; the flanks mixed with brown and creamy-yellow; under tail-coverts crimson-scarlet.

Colours of soft parts. Iris dark brown; bill horny-yellow, darker at the tip and blackish along the culmen; legs dull greenish-brown.

Measurements. Wing 141 to 145 mm.; tail 94 to 97 mm.; tarsus 31 to 32 mm.; culmen 39 to 46 mm.

Young. Like the adult but very dull and the lower parts mixed with dull pale blue and dark brown, the latter predominating.

Fig. 16.—Head of *M. v. virens.*

Distribution. North Central and East Burma to Tenasserim, through Siam, Yunnan and the Indo-Chinese countries to South China.

Nidification. The Great Chinese Barbet breeds in the hills throughout its range from 1,000 feet, or even lower, up to 7,000 or 8,000 feet. The nest-holes are generally bored in the upright branches or in the stem of the tree itself and at any height between 20 and 40 feet from the ground. A branch is selected which is rotten or has a rotten core and the short entrance tunnel leads straight into some natural hollow, in which the eggs are laid. These latter seem to number two or three only and are of the usual description, though very big. Fourteen eggs average 34·3 × 26·9 mm.: maxima **39·2 × 28·6** mm.; minima **30·4 × 25·4** mm. The largest egg, one of a pair of immense eggs taken by Hopwood, is probably abnormally large.

Bingham took eggs in February and March, Grey in February and Hopwood as late as the 21st April.

Habits. The same in all respects as those of the better-known *M. v. magnifica* and *M. v. marshallorum.*

(1427) Megalaima virens marshallorum.

THE GREAT HIMALAYAN BARBET.

Megalæma marshallorum Swinh., Ann. Mag. Nat. Hist., ser. 4, vi, p. 348 (1870) (Simla); Blanf. & Oates, iii, p. 85 (part).

Vernacular names. *Traiho* (Hind, Chamba); *Miouli* (Mussoorie); *Nyahul*, *Neoul* (Nepalese); *Kun-nyong* (Lepcha).

Description. Similar to the preceding bird but the head with blue reflections and no tinge of green; generally speaking, the colour is much paler both above and below; the extreme hind-neck and upper back have a collar of feathers streaked with pale green or yellow, absent in *M. v. virens* or only showing as a few pale streaks of white or bluish-white.

Colours of soft parts as in the Great Chinese Barbet.

Measurements. Wing 146 to 152 mm.; tail 100 to 109 mm.; tarsus 23 mm.; culmen about 46 mm.

Distribution. The North-West Himalayas from Murree and Mussoorie, Kashmir, Garhwal to Nepal and Sikkim. Birds from these two latter places are intermediate between this and the next form but are nearer *marshallorum*.

Nidification. This fine Barbet breeds freely in the forests of the North-West Himalayas during May and June between 3,000 and 8,000 feet. A few late birds lay well on into July on the higher ranges and, on the other hand, the earliest are breeding by the end of April on the lower hills. They are said often to make use of deserted nesting-holes of Woodpeckers and natural hollows but more often they excavate the entrances of their nest-holes in rotten, upright branches of trees leading into natural hollows. They apparently always select forest trees as sites and excavate at any height between 10 and 15 feet from the ground. The eggs number three or four, very rarely five, and twenty-five average 34·0 × 24·9 mm.: maxima **36·4 × 26·2** mm.; minima **32·2 × 42·0** mm.

The eggs of this Barbet, as of all others, often show very faint, depressed lines running longitudinally down the egg, looking like water-marks on paper when held against the light.

Habits. A very common bird over the greater part of its range, yet not often seen, though its loud wailing note of "pio-pio-pio" may be heard complaining in all directions. According to the Garhwalis, this bird is a transformation of a man who died of grief on losing a lawsuit and who now calls perpetually "un-nee ao, un-nee ao" (Injustice, injustice). Except when the young first leave the nest and travel about with their parents, they keep either in pairs or singly but often collect in very large numbers when favourite fruit-trees are ripe. Dodsworth mentions large flocks collecting in Simla on the Medlar-trees, the fruit of which they devour whole. Their diet is mainly vegetable berries, fruit and

buds; they, however, eat insects of all kinds, not only soft but "shining green coleoptera" etc. The flight is strong but dipping and rather clumsy in appearance and seldom long-sustained. They keep, unless specially tempted by ripe fruit, principally to the higher branches of high trees.

(1428) **Megalaima virens magnifica.**

THE ASSAM GREAT BARBET.

Megalaima virens magnifica Stuart Baker, Bull. B. O. C., lxvii, p. 43 (1926) (Manipur).
Megalæma marshallorum. Blanf. & Oates, iii, p. 84 (part).

Vernacular names. *Daokunt-laima* (Cachari).

Description. Similar to *M. m. marshallorum* but much more deeply and richly coloured both above and below. It is intermediate between the two preceding birds, having the blue head of the Himalayan bird but the rich colouring of the Chinese form. The streaks on the back are few in number and are generally white or bluish and not yellow or green as in *M. v. virens.*

Colours of soft parts as in the other races.

Measurements. Wing 141 to 145 mm.; tail 93 to 96 mm.; tarsus about 32 mm.; culmen 39 to 45 mm.

Distribution. Assam, North and South of the Brahmapootra, Manipur, Looshai and Chin Hills; Hill Tracts of Tippera and Chittagong.

Nidification. The Assam Great Barbet breeds between 2,500 and 6,000 feet throughout its range and in the Naga Hills ascends about 2,000 feet higher still. I have taken eggs from the 10th April up to the 1st July, the latter being probably a second laying. The nest-holes are similar to those of the preceding bird but are nearly always excavated for the purpose, natural hollows not being employed. The eggs number two or three only, never, so far as I know, four. Twenty-four average 24·9 × 24·3 mm.: maxima **36·5** × 24·9 and 33·2 × **26·1** mm.; minima **33·2** × 26·1 and 34·1 × **22·0** mm.

Habits. This magnificent Barbet is very common in the Assam Hills between 3,000 and 5,500 feet but it keeps so closely to the dense foliage of high forest trees that it is difficult to get a sight of it. It has the same very melancholy wail as the other races and when uttering this note sits perched very rigid and upright, its head being jerked backwards with each call. It is a solitary bird, except when with its own family in July and early August, but when the Pepul and other forest *Fici* are ripe, it often collects in very large numbers and an old Naga trapper once caught fourteen in a morning on one tree. It eats fruit of all kinds, the larger soft ones being torn into large pieces before being swallowed, the smaller gulped down whole. During the breeding-season it also devours insects of all kinds, hard and soft, but at other times

keeps to soft insects, such as caterpillars, larvæ, grubs, etc., which it hunts for in the crevices of the bark. Whilst thus employed it clambers about like a Woodpecker, though its movements are very slow and laboured and its tail is not used as an aid.

Genus THEREICERYX.

Thereiceryx Blanford, Ibis, 1893, p. 237.

Type, *Bucco zeylanicus* Gmelin.

In *Thereiceryx* the bill has the culmen less high than it is in *Megalaima* and the nostrils are exposed. The wing is short and rounded and the tail graduated.

The plumage is rather peculiar, the head, neck and breast being brown with paler streaks and the rest of the plumage green.

Key to Species.

A. A large naked orbital space extending to gape ..... *T. zeylanicus*, p. 108.
B. Naked space smaller, not extending to gape.
a. Wing over 110 mm. ..... *T. lineatus*, p. 111.
b. Wing under 105 mm. ..... *T. viridis*, p. 113.

Thereiceryx zeylanicus.

Key to Subspecies.

A. Darker and more richly coloured ..... *T. z. zeylanicus*, p. 108.
B. Paler and less richly coloured.
a. Brown on both upper and lower parts more extensive; breast-streaks very faint .. *T. z. inornatus*, p. 110.
b. Brown on upper and lower parts less extensive; breast-streaks bolder and wider ..... *T. z. caniceps*, p. 110.

(1429) Thereiceryx zeylanicus zeylanicus.

THE CEYLON GREEN BARBET.

Bucco zeylanicus Gmel., Syst. Nat., i, p. 408 (1788) (Ceylon).
Thereiceryx zeylonicus. Blanf. & Oates, iii, p. 86 (part).

Vernacular names. *Kutur haki* (Can.); *Gandu Karnam* (Tel.); *Kotoruwa* (Cing.); *Kutur*, *Kukuruvan* (Tam., Ceylon).

Description. Whole head, neck and breast brown, each feather with a pale shaft-stripe, more conspicuous on the neck and sides of the breast, least so on the forehead and chin; upper parts bright grass-green, merging gradually into the brown of the head; feathers of the mantle with pale shafts and tiny bright pale tips; wing-coverts like the back, but tipped with pale specks; primaries brown, the two outer plain, those next them edged with

yellowish on the terminal half and green on the basal half; inner primaries and outer secondaries green on the exposed parts, brown elsewhere; abdomen and posterior flanks pale green, the colours of the breast and abdomen grading into one another; under surface of tail bluish; wing-coverts and axillaries mixed buff and green.

Colours of soft parts. Iris brown to Indian red; orbital skin orange, duller in the non-breeding season; bill orange-brown, darker on the culmen, paler on the tip and base of the commissure; legs and feet yellowish-brown.

Measurements. Wing 113 to 118 mm.; tail 70 to 75 mm.; tarsus 29 to 30 mm.; culmen 30 to 33 mm.

Young. Similar to the adult, but obsoletely striped and, generally, much paler and duller.

Distribution. Ceylon and South Travancore.

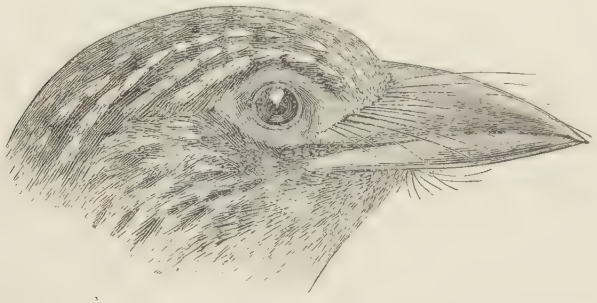

Fig. 17.—Head of *T. z. zeylanicus.*

Nidification. Wait says this Barbet breeds from March to August and possibly has several broods in the year. "The nest-hole is hollowed out of a rotten tree or even a fence-post. The three dull white eggs are usually laid on a few stalks of dried grass which line the bottom of the cavity. The average size is 1·23 × ·87″ (=31·2 × 24·1 mm.)." Eggs in my collection taken by Mr. J. Stewart in South Travancore average smaller but the series is too small to be a guide.

Habits. This Barbet frequents the vicinity of towns and villages or thin scrub and the edges of forest near cultivation and is found from the Plains up to 3,000 or even 4,000 feet. It is a bold fearless bird and does not shun observation but will sit in a full view, uttering its monotonous call of "kotur-kotur-kotur" for minutes together. Sometimes these syllables will be preceded by a harsh chuckle and sometimes the series is finished up with it. The flight is strong but is dipping and always appears rather laboured. The diet is principally fruit, especially Fici of various sorts, but also consists of soft insects, larvæ, etc.

(1430) Thereiceryx zeylanicus caniceps.

THE NORTHERN GREEN BARBET.

Bucco caniceps Franklin, P. Z. S., 1831, p. 121 (Calcutta–Benares).
Thereiceryx zeylonicus. Blanf. & Oates, iii, p. 86 (part).

Vernacular names. *Barra Basanta* (Hind. and Beng.); *Kutumra* (Deccan); *Kadrunga* (Hind. in Centr. Ind.); *Kotur* (Rohilkund and Doab); *Sunterar* (Beng., Manbhum).

Description. Very close to typical *T. z. zeylanicus* but duller and paler and rather less boldly streaked.

Colours of soft parts. Iris red-brown; orbital skin dull orange; bill orange-brown, darker at the tip and on the culmen; legs and feet light brownish-yellow.

Measurements. Wing 116 to 123 mm.; tail 74 to 79 mm.; tarsus 29 to 30 mm.; culmen 31 to 35 mm.

Distribution. India North of the range of *T. z. inornatus.* Throughout the Himalayan Terai, East to Bihar and Western Bengal, straggling as far as Calcutta. On the South it extends through Orissa and probably into the North of the Madras Presidency.

Nidification. The Northern Green Barbet breeds principally in April and May but many birds breed in March and Dr. Coltart took eggs up to the end of July, possibly second broods, in Somastipur. Most nest-holes are bored in the trunks of dead or semi-dead trees, some in the larger vertical branches and others in the underside of horizontal ones. The most common height selected is about ten or twelve feet from the ground, seldom above twenty. The eggs number two to four and are not distinguishable from those of the other races. Thirty eggs average 29·3 × 22·3 mm.: maxima **30·1 × 23·0** mm.; minima **27·3** × 20·7 and 29·3 × **20·0** mm.

Habits. Much the same in note, diet, flight, etc., as the other races of this species. It is a familiar, confiding bird, common in gardens, orchards and cultivation round villages and towns, even breeding occasionally in trees beside streets in towns.

(1431) Thereiceryx zeylanicus inornatus.

THE BOMBAY GREEN BARBET.

Megalæma inornata Walden, Ann. Mag. Nat. Hist. ser. 4, v, p. 219 (1870) (Coorg).
Thereiceryx zeylonicus. Blanf. & Oates, iii, p. 86 (part).

Vernacular names. *Kuturga* (Mahr.); *Kutur haki* (Can.); *Gandu Karnam* (Tel.).

Description. Differs from *T. z. zeylanicus* in having the brown extending further on to the breast and lower back; the whole plumage is paler and duller and the streaks on the breast

are confined to the pale shafts; the pale specks on the wing-coverts are wanting and the streaks on the head and upper back are generally less conspicuous. South Travancore birds are intermediate but on the whole much nearer true *zeylanicus*.

Colours of soft parts as in the other races.

Measurements. Wing 119 to 123 mm.; tail 74 to 80 mm.; tarsus 29 to 30 mm.; culmen 35 to 38 mm.

Distribution. Travancore, excluding the Southern quarter, North to the Godavery. Birds from Mt. Aboo are also of this race. East it apparently extends to the Nilgiris and Cannanore but there are no specimens in the British Museum.

Nidification. Breeds in March and April from Travancore to the Nilgiris, where Col. R. H. Baker took eggs. The birds breed from the level of the Plains up to at least 3,000 feet and possibly a good deal higher. The number of eggs laid seems to be two or three only.

Habits. Similar to those of the other races.

Thereiceryx lineatus.

Capito lineatus Vieill., Nouv. Dict. d'Hist. Nat., iv, p. 500 (1816).

Type-locality: Australasia, Java.

The typical form is smaller than any of our Indian or Burmese birds.

Key to Subspecies.

A. Smallest; wing average about 117 mm.	*T. l. lineatus.*
B. Intermediate; wing average about 124 mm.	*T. l. intermedius*, p. 113.
C. Largest; wing average about 131 mm.	*T. l. hodgsoni*, p. 111.

(1432) Thereiceryx lineatus hodgsoni.

THE ASSAM LINEATED BARBET.

Megalæma hodgsoni Bonap., Consp. Av., i, p. 144 (1850) (Nepal).
Thereiceryx lineatus. Blanf. & Oates, iii, p. 88 (part).

Vernacular names. *Dang kun-nyong* (Lepcha); *Kudurta*, *Khotoor* (Nepal); *Pho-goung* (Burmese); *Dao-tukra* (Cachari); *Inruikuru* (Kacha-Naga).

Description. Very similar to *T. z. zeylanicus* but with much broader pale streaks both above and below; the chin and throat are wholly dull white or very nearly so; the wing-coverts and back have no pale spots or striations except on the extreme upper back; the bare patch round the eye is smaller and divided from the base of the bill by a broad line of feathers.

Colours of soft parts. Iris brown; eyelids and orbital skin

deep yellow; bill horny-yellow, culmen and tip darker; legs and feet fleshy-yellow to orange-yellow.

Measurements. Wing 123 to 137 mm.: average 131 for 103 skins; tail 82 to 86 mm.; tarsus 29 to 30 mm.; culmen 30 to 33 mm.

Distribution. Mussoorie and Simla to E. Assam, Northern Burma and N. Shan States.

Nidification. The Assam Lineated Barbet breeds in the plains of Assam and the lower hills of Assam and the Duars West to Garhwal and Kuman in April and May, a few birds as late as June. It is an extremely common bird in Assam, excavating its nest-hole in old stumps and dead trees, or in semi-rotten branches of living ones, both in forest and in open country or even in gardens and orchards. It breeds certainly up to 4,000 feet, though much more commonly below 2,500 feet. In Northern Burma, as in Assam, it is resident in the plains near hills but West of Assam it probably does not breed in the plains at all. Unlike most Barbets it appears to have no special position in which to excavate the entrance to its nest-hole but when this is made in the upper surface of a bough, it is always so made as to be protected from wet. Most nests are made between 6 to 16 feet from the ground, but occasionally they are made as high as 30 or 40 feet. The eggs number two to four and are typical of the family. One hundred average 30·6 × 22·9 mm.: maxima **32·4** × 23·0 and 31·6 × **24·8** mm.; minima **27·0** × 21·3 and 27·2 × **19·5** mm.

Habits. The Lineated Barbets are birds both of the forest and of cultivated tracts but are not found often far from the edges inside heavy forest. The note is a harsh "kotur kotur," which it utters at intervals even during the hottest hours of the day and on moonlight nights. Besides this call, however, it has many other. If angry or annoyed at the too close approach of some other bird, it utters a wheezy "pénch pénch," its mouth wide open, its wings drooping and a general attitude of ferocity quite out of keeping with so feeble a sound. Pleasure it exhibits by a guttural chuckle, uttered only when on the move or accompanied by a little jump into the air. Yet another call is a loud musical whistle, most unexpected from a Barbet and apparently only used to call together scattered members of a family flock. Its diet consists normally of any kind of fruit, most soft insects, larvæ, grubs, etc. but it will also devour small lizards, tree-frogs and even nestlings of other birds which fall from their nest. For the most part they haunt trees and these often at great heights but I have seen them on the ground feeding on strawberries or on termites when these are in flight. It sometimes climbs about trees like a Woodpecker but its actions are then even slower than those of the Great Green Barbets. Its flight is strong but heavy and dipping.

(1433) Thereiceryx lineatus intermedius.

THE BURMESE LINEATED BARBET.

Thereiceryx lineatus intermedius Stuart Baker, Bull. B. O. C., xxxix, p. 9 (1918) (Pakpoon, Burma).
Thereiceryx lineatus. Blanf. & Oates, iii, p. 88 (part).

Vernacular names. *Pho-goung* (Burmese).

Description. Exactly like *T. l. hodgsoni* except for its smaller size.

Colours of soft parts as in the preceding race.

Measurements. Wing about 115 to 129 mm.: average 124 for 71 birds.

Distribution. Central and South Burma; Malay States to Patani (*Rob. & Kloss*); Siam, South Shan States, Cochin China and Annam.

Nidification. This race breeds in Burma from April onwards, eggs having been taken as late as 23rd July by Grant and as early as 25th March by Bingham in Tenasserim. The nest-holes seem to be excavated in almost any position and equally often in the main trunks of trees and in lesser branches. Two to three eggs seem to form the full clutch and they are indistinguishable from other Barbets' eggs. Six in my own collection vary between $32{\cdot}0 \times 22{\cdot}8$ and $29{\cdot}1 \times 20{\cdot}2$ mm.

Habits. Similar to those of the preceding bird. It frequents the well-wooded plains of Burma as well as the lower hills up to 2,000 feet and, more rarely, up to 3,500 feet.

(1434) Thereiceryx viridis.

THE SMALL GREEN BARBET.

Bucco viridis Bodd., Tabl. Pl. Enl., p. 53 (1783) (India).
Thereiceryx viridis. Blanf. & Oates, iii, p. 89.

Vernacular names. *Chota Bassant* (Hind.).

Description. Crown and nape brown, the feathers of the former with pale edges but no streaks, the latter with faint indications of streaks, especially on the sides; upper plumage grass-green, the feathers of the upper back where the green and brown merge into one another streaked with yellowish; primaries black, all but the two outermost with the basal edges green and the terminal outer edges yellowish; remainder of visible closed wing grass-green; throat and chin white to dirty brownish with white spiky shafts; a short supercilium and broad line from the lores through the ear-coverts white; sides of head and neck, fore-neck and breast whitish, each feather edged at the sides with brown; remaining underparts bright pale yellowish grass-green; axillaries and under wing-coverts dull white.

Colours of soft parts as in the Lineated Barbets.

Measurements. Wing 92 to 102 mm.; tail 59 to 65 mm.; tarsus 27 to 28 mm.; culmen 24 to 26 mm.

Distribution. The Hill Ranges from South Travancore to Mahableshwar, Belgaum and Deccan. The birds from the extreme South are practically no smaller than those from the extreme North of this bird's range.

Nidification. The Small Green Barbet has a very extended breeding-season. In the Nelliampathy Hills Kinloch took eggs in February, whilst Darling found them laying in the Nilgiris from March to early June. They excavate their nest-holes in dead trees and though they will sometimes cut them out in wood which is externally quite sound, they undoubtedly prefer such as is very rotten and soft. In some suitable trees they continue to breed for several years in succession, usually cutting a new entrance each year. They are extraordinarily tame and persistent in sticking to a nesting-site and Butler records its laying three and four clutches in the same nest-hole in one season. It does not mind at what height it excavates its nest-hole, this having been found as high as fifty feet up and as low as two feet down in a decayed stump. The eggs number two to four, generally three. Hume gives the average of a large series as 28·7 × 21·8 mm. but thirty measured by myself only average 26·2 × 20·0 mm.: maxima **29·0 × 19·9** and 27·1 × **21·6** mm.; minima **24·6** × 19·3 and 27·0 × **18·9** mm.

Habits. Very similar to those of the Lineated Barbets. The note is also much the same but softer and each call ends in a rather reverberating "kotur-r-r-r." This species is found from the level of the Plains up to the peaks of the highest Southern Hills, some 8,000 feet or more. It frequents well-wooded country of any kind except heavy forest and is quite common in gardens and cultivated tracts. Like all Barbets during the breeding-season, it clambers about the trunks and bigger branches of trees, tapping here and there searching for soft places in which to excavate its nest-hole. The tapping is slow, consisting of single quite audible taps, never reverberating in a rapid succession of sounds like those of the Woodpecker. If watched carefully and continuously it would doubtless prove to have just as wide a repertoire of notes as the Lineated Barbets.

Genus **CHOTORHEA.**

Chotorhea Bonap., Consp. Volucr. Zygod., p. 12 (1854).

Type, *Chotorhea javensis* Horsf.

The genus *Chotorhea* has a black, rather long bill, the length being more than twice the height and greatly exceeding the tarsus; the culmen is considerably curved and the nostrils are exposed; the wing is short and rounded and the tail very slightly graduated. Sexes different.

(1435) Chotorhea mystacophanes.

THE GAUDY BARBET.

Bucco mystacophanes Temm., Pl. Col., No. 315 (1824) (Sumatra).
Chotorhea mystacophanes. Blanf. & Oates, iii, p. 91.

Vernacular names. None recorded.

Description.—Male. A line across the forehead black, the feathers tipped with crimson; forehead and anterior crown golden-yellow; posterior crown, nape, lores, chin, throat and a patch on the side of the neck deep crimson; whole upper plumage and visible portions of closed wing dark grass-green, the feathers of the neck and extreme upper back edged with brighter paler green; primaries brown, edged with green on the basal and with yellowish on the terminal halves; cheek blue; a patch from lower mandible golden-yellow; a short supercilium black; lower plumage bright, light grass-green, sometimes bluish on the throat; undersurface of tail washed with blue.

Colours of soft parts. Iris brown; orbital skin dark greenish or greyish-brown; bill black, paler and yellowish at the base; legs and feet very pale bluish or horny-green.

Measurements. Wing 94 to 102 mm.; tail 50 to 57 mm.; tarsus 27 to 28 mm.; culmen 28 to 35 mm.

Female. Forehead, anterior crown and sides of the head blue; chin and throat yellow, some of the feathers tipped with crimson; crimson patch on the neck very small; otherwise as in the male.

Young birds almost uniform green, the cheeks below the eyes and less ill-defined band across the forehead bluish; a small reddish-orange spot in front of the eye.

From this stage the throat grows yellow, the forehead dusky mingled with orange, whilst a few red feathers show on the crown. This red increases gradually in extent, the cheeks become blue and the throat golden; later the red feathers of the chin and throat appear and finally the red breast-spots and the golden forehead (*Hume*).

Distribution. Sumatra, Borneo, Malay Peninsula and the Southern half of Tenasserim to Tavoy; South-West Siam.

Nidification. Unknown.

Habits. Davison states that this is a forest bird, frequenting dense evergreen forest or, less often, comparatively thin tree-jungle. The call he syllabifies as "tok-toktok—tok—toktok," uttered incessantly both by day and by moonlight night. He adds: "It is very fond of clinging to the trunks of trees and tapping away like a Woodpecker and many of those I obtained I shot while so engaged" It is very common in South Tenasserim and North Malay Peninsula.

Genus CYANOPS.

Cyanops Bonaparte, Consp. Volucr. Zygod., p. 12 (1854).

Type, *Cyanops asiatica* Lath.

The genus *Cyanops* is close to the preceding both in pattern and character of coloration but is at once separable from it by the bill, which is very much shorter, either not exceeding or only slightly exceeding the tarsus in length; the wing is greatly rounded, the fourth primary longest and the second shorter than the tenth.

Representatives of the genus are found over the greater part of the Oriental Region.

Key to Species.

A. Chin and throat blue or bluish-green.
  a. Anterior crown red; forehead red.. *C. asiatica*, p. 116.
  b. Crown blue-green; a red patch on hind-crown ..... *C. incognita*, p. 119.
  c. Forehead and sinciput golden-yellow; occiput green..... *C. flavifrons*, p. 120.
  d. Sinciput black; occiput blue ... *C. duvaucelii*, p. 121.
B. Chin and throat yellow and grey .. *C. franklinii*, p. 124.
C. Chin, throat and whole head green .. *C. robustirostris*, p. 123.

Cyanops asiatica.

Key to Subspecies.

A. Back with no trace of red.
  a. Band across vertex black..... *C. a. asiatica*, p. 116.
  b. Band across vertex blue..... *C. a. davisoni*, p. 118.
B. Back suffused with red ..... *C. a. rubescens*, p. 119.

(1436) Cyanops asiatica asiatica.

THE BLUE-THROATED BARBET.

Trogon asiaticus Lath., Ind. Orn., i, p. 201 (1790) (India, Lady Impey's Coll., now restricted to Calcutta).
Cyanops asiatica. Blanf. & Oates, iii, p. 92 (part).

Vernacular names. *Barra bussunt bairi, Barra benebo* (Beng.); *Corul* (Mahamedans in Beng.); *Kat-tak* (Lepcha); *Rúturki* (Nepal.); *Hútúruru* (Chamba); *Kok-kha-loung* (Burm.); *Dao tukra-gadeba* (Cachari); *Tuk-tukra-sorai* (Assam).

Description. Forehead crimson, then yellowish, followed by a broad black band across the vertex; anterior crown, a speck at the base of the lower mandible and a patch on either side at the base of the throat crimson; a streak of black on either side of the red crown; a short supercilium, feathers round the eye, cheeks, ear-coverts, chin and throat verditer-blue; upper plumage bright grass-green, the hind-neck brighter than elsewhere; outer

primaries black, all but the first two edged with blue-green on the basal halves and with yellowish on the terminal halves of the outer webs; remainder of closed wing like the back, more blue on the outer coverts; bases of inner webs of quills ochre-white on the edges; lower parts yellowish-green; the under surface of the tail washed with blue.

Colours of soft parts. Iris brown to deep red-brown; orbital skin orange; bill horny-green, yellowish on base, commissure and gape, black at tip and on culmen; legs and feet dull greenish-slate or yellowish-green, claws black.

Measurements. Wing 100 to 110 mm.; tail 62 to 69 mm.; tarsus 25 to 26 mm.; culmen 23 to 27 mm.

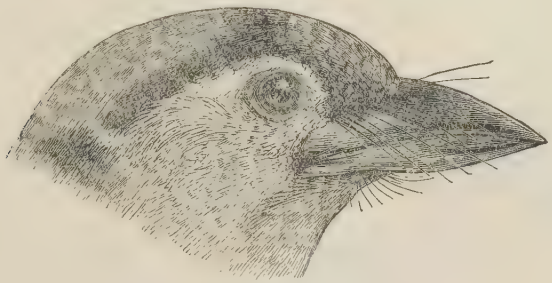

Fig. 18.—Head of *C. a. asiatica.*

Young birds are dull replicas of the adult, the crimson forehead and crown showing dully and mixed with dull green and blackish but coming right across the crown and not in a nuchal patch as in *incognita.*

Nestlings have the whole upper head dull green.

Distribution. From Mussoorie and Kashmir, but apparently rare anywhere East of Nepal, through Nepal, Sikkim, Assam and Eastern Bengal, practically the whole of Burma as far South as Northern Tenasserim; East to Kachin Hills, Yunnan, Shan States and Siam.

Nidification. In Southern Assam this Barbet breeds in great numbers between the Plains and 4,000 feet from the end of March to the end of June, often having two broods. In the hills of Northern Assam to Kuman it appears to breed up to an elevation of 8,000 feet or more but to have the breeding-season practically restricted to April and May. It usually selects a dead tree in dense forest for a nesting-site but at other times it is satisfied with one in thin deciduous forest or in open cultivation. In most cases the entrance is made somewhere between ten and twenty feet from the ground but in others either at much greater or at even lower heights. The entrance may be anything between 40 and 50 mm. across and the tunnel is generally very

short, leading into a wider chamber cut out of the rotten wood. The eggs number three or four, rarely five, and are of the usual type. Thirty average 27·8 × 20·5 mm. : maxima **30·0** × 20·8 and 28·1 × **22·1** mm.; minima **26·7** × 21·1 and 27·1 × **19·3** mm. Both male and female share in the duties of incubation and, even when not sitting on their eggs, one parent keeps in the nest-hole, the head peeping from the entrance, the mouth wide open during the heat of the day.

Habits. The Blue-throated Barbet prefers densely-wooded valleys, especially such as have streams running through them but they may also be found in any well-wooded country. The call is tri-syllabic and sounds like "took-a-ruk, took-a-ruk," constantly repeated and often ending in a rippling "kur-r-r." It has, however, many other notes just like those of *Thereiceryx* but not so harsh and guttural. It does not associate in flocks and even the family parties seem to break up very quickly, though great numbers may be seen together on favourite fruit-trees. Like most Barbets, though preferring fruit it eats soft insects, grubs, etc., freely, and I took a large centipede from the stomach of one bird shot off the nest. It roosts sitting very upright on a branch selected close to the main trunk and not high up in the upper branches.

(1437) Cyanops asiatica davisoni.

DAVISON'S BLUE-THROATED BARBET.

Megalæma davisoni, Hume, Str. Feath., v, p. 108 (1877) (Meetan, S. Tenssserim).
Cyanops davisoni. Blanf. & Oates, iii, p. 93.

Vernacular names. *Kok-kha-loung* (Burmese).

Description. Differs from the Indian Blue-throated Barbet in having the band across the vertex black instead of blue; the black line above the supercilium much more pronounced and divided by a few blue feathers from the crimson of the crown.

Colours of soft parts as in the preceding form.

Measurements. Wing 92 to 102 mm.

Distribution. South peninsular Burma and Siam from Tavoy southwards; Rippon obtained specimens in the South Shan States and many birds from Eastern Burma are intermediate between this and the last race. La Touche has named two specimens with wings of 102 and 103 mm.—*laurentei*.

Nidification. Bingham took two clutches of this Barbet's eggs in the Thoungyeen Valley in Tenasserim, both of two eggs, on the 16th and 20th March. Both nest-holes were cut in horizontal branches of large trees, the entrance on the underside. The eggs are indistinguishable from those of the other races.

Habits. Those of the species.

CYANOPS A. RUBESCENS ♂ 2/3
The Ruddy Barbet.

(1438) Cyanops asiatica rubescens.

THE RUDDY BARBET.

Cyanops rubescens Stuart Baker, Nov. Zool., iii, p. 257 (1896) (N. Cachar).
Cyanops asiatica. Blanf. & Oates, iii, p. 92 (part).

Vernacular names. *Dao-tukra-gajao* (Cachari).

Description. Similar to *C. a. asiatica* but with the upper parts suffused with crimson; the underparts are also flecked and streaked with crimson, though in varying degree and generally less so in females than in males.

Colours of soft parts as in *C. a. asiatica.*

Measurements. Wing 107 to 116 mm.

Young birds have no crimson on the upper or lower plumage.

Distribution. The Higher ranges of hills South of the Brahmapootra, Manipur and Lushai Hills. Inglis also obtained this race in the Dooars in Winter at about 500 feet.

Nidification. This Barbet breeds between 5,000 and 6,000 feet in the Khasia and Cachar Hills, selecting trees either in evergreen forest or in clearings prepared for cultivation in such forest. The eggs have always been three in each clutch I have taken and they are quite indistinguishable from those of *C. a. asiatica* but fifteen average larger, 29·2×21·0 mm.: maxima **31·0**×20·3 30·5×**23·0** mm.; minima **28·3**×20·7 and 29·0×**20·0** mm. All my eggs have been taken in May.

Habits. This appears to be merely a local form of *C. a. asiatica*, occurring at higher levels which are very humid. Still higher ranges in Sikkim and Westwards are inhabited by birds exactly like the typical form and the breeding area of Inglis's Winter specimens will probably be found to be the wettest parts of the Terai at about 6,000 feet.

(1439) Cyanops incognita.

HUME'S BLUE-THROATED BARBET.

Megalaima incognita Hume, Str. Feath., ii, p. 442 (1874) (Tenasserim, 25 miles N. of Yea).
Cyanops incognita. Blanf. & Oates, iii, p. 94.

Vernacular names. None recorded.

Description. A small patch of crimson in front of the lores running across the base of the bill; a small patch of the same on the extreme hinder crown; remaining whole crown bluish-green, the centres of the feathers blackish; feathers round the eye golden-yellow; a line from the base of the lower mandible black; sides of head and neck, chin and throat pale bluish-green; remainder of plumage as in the other Blue-throated Barbets.

Colours of soft parts. Iris brown; upper mandible black, the base and lower mandible yellow-horny to bluish-horny, the tip blackish; legs and feet dull sap-green to bright grass-green.

Measurements. Wing 89 to 98 mm.; tail 54 to 60 mm.; tarsus about 25 mm.; culmen 21 to 23 mm.

Young birds have no red patch on the nape or breast and are rather duller than the adult.

Distribution. Tenasserim from Tavoy in the South to Amherst and Myawadee in the North. Probably peninsular Siam in the same latitudes, as two young birds collected by Mr. E. G. Herbert at Keo-Tung-Song appear nearer to this species than to *davisoni*.

Nidification. Unknown.

Habits. Davison found this bird in thin tree-forest at Yea and Amherst, and Bingham in heavier forest in Thoungyeen. In habits it is said to closely resemble *C. a. asiatica*, to have a similar call and to be entirely frugivorous.

(1440) Cyanops flavifrons.

THE YELLOW-FRONTED BARBET.

Bucco flavifrons Cuvier, Règne Anim., i, p. 428, ex Levaill. (1817) (Ceylon)
Cyanops flavifrons. Blanf. & Oates, iii, p. 94.

Vernacular names. *Koturuwa* (Cing.); *Kotur*, *Kukuruvan* (Tam.).

Description. Forehead and a spot at the base of the lower mandible bronze-yellow; crown dark green, each feather edged with bronze and pale-shafted; remaining upper plumage and exposed parts of wings and tail dark grass-green; the feathers of the nape, back and sides of neck streaked with whitish; feathers of the rump brighter than the back; the outer primaries black, the others edged as in the other species of *Cyanops*; short supercilium, sides of head, chin and throat verditer-blue; lower plumage bright pale green, the feathers of the breast edged with darker green and the flanks washed with the same; under surface of tail washed with blue; edge of wing emerald-green.

Colours of soft parts. Iris light red; bill greenish horn-colour, darker about the nostrils; legs and feet greenish or bluish.

Measurements. Wing 88 to 95 mm.; tail 56 to 59 mm.; tarsus 24 to 25 mm.; culmen 19 to 23 mm.

Distribution. Ceylon only.

Nidification. According to Legge this Barbet breeds from February till September, having two or more broods in the year. It is said to excavate its nest-hole in soft-wooded trees such as

Bombax malabaricum and to lay two or three eggs of the usual type. Wait gives the average size as 1·10 × ·80″ (= 27·9 × 20·3 mm.), which seems unusually large for so small a bird.

Habits. The Yellow-fronted Barbet is found from the lowlands up to some 6,400 feet through a great part of Ceylon but it appears to be very locally distributed. Wherever it occurs its loud call, like that of *Thereiceryx zeylanicus* but with a preliminary roll and a higher cadence, is heard all day long with monotonous persistence. It is chiefly a forest bird but is also found in all the tea-gardens, coffee-plantations, etc., as well as in the cultivated clearings round forest. Legge considers it to be a purely vegetarian feeder and remarks on its gluttony, a common trait in this family.

Cyanops duvauceli.

Bucco duvauceli Lesson, Traité d'Orn., p. 164 (1831).

Type-locality : Sumatra.

Key to Subspecies.

A. Malar patch scarlet.
  a. Black breast-patch large; blue of crown extending to nape..... *C. d. duvauceli.*
  b. Black breast-patch moderate or small; blue of crown not extending to hinder crown ..... *C. d. stuarti*, p. 123.
B. Malar patch mixed yellow and scarlet .... *C. d. cyanotis*, p. 121.

Messrs. Robinson and Kloss have examined a very large mass of material and have come to the conclusion that my *C. d. robinsoni* from the extreme South of the Malay Peninsula (Klang) is too near the true *duvauceli* for the name to be retained and have therefore named a bird from further North (Junk Ceylon) *stuarti*. Further material may prove that we shall have to retain all *three* names but for the present I sink *robinsoni* as a synonym of *duvauceli*. Robinson's *C. d. orientalis* from the Franco-Siamese boundary differs from *C. d. cyanotis* merely in being larger with a distinctly heavier, longer bill. It occurs in Siam and may possibly be found in some parts of the extreme East of Burma.

(1441) Cyanops duvauceli cyanotis.

THE INDIAN BLUE-EARED BARBET.

Bucco cyanotis Blyth, J. A. S. B., xvi, p. 487 (1847) (Arakan).
Cyanops cyanotis. Blanf. & Oates, iii, p. 95 (part).

Vernacular names. *Nyet-pa-din* (Arakan); *Dao-tukra-kashiba* (Cachari).

Description. Feathers above nostril white; forehead and

anterior crown black, the former flecked with blue; posterior crown blue, changing to dull green on the nape and to grass-green on the upper plumage and exposed parts of wings and tail; primaries black, marked as usual with green and ochre-white; lores mottled blue and black; ear-coverts blue; a patch of crimson above and below them; cheek-patch next the lower mandible yellow flecked with crimson; chin and throat blue; a black streak between the chin and malar patch; remainder of lower surface bright light grass-green; the tail is suffused with bluish above in many specimens and invariably washed with blue below.

Colours of soft parts. Iris dark brown or reddish-brown; bill dark horny-brown, yellowish-green on the base and gape, black at the tip and on culmen; legs and feet dull green, or yellowish-green to slaty-green.

Measurements. Wing 77 to 85 mm.; tail 45 to 50 mm.; tarsus about 21 mm.; culmen 18 to 21 mm.

Young birds have the whole head green, washed with blue on the throat and ear-coverts.

Distribution. Sikkim to Assam; Siam and Burma South to the North of Tenasserim.

Nidification. The Blue-eared Barbet breeds commonly in the foothills and lower ranges of hills in Assam between 1,000 and 4,000 feet but more commonly below 2,500 feet than over this height, whilst in Lakhimpur we found many birds resident at about 700 feet. The sites selected for excavating the nest-holes are generally in trees standing in evergreen forest, occasionally in cultivation clearings surrounded by forest. The entrance is most often made in the main stem or in a vertical branch and does not measure more than $1\frac{1}{2}''$ across, the depth of the tunnel and size of the chamber depending on the rottenness of the limb selected. Two to four eggs are laid and when the latter number forms the clutch, there appears to be often an interval of three or four days between the deposition of the second and third. The eggs are of the usual type and vary in shape from very long oval to broad, short ones. Forty eggs average 24·5 × 18·3 mm.: maxima **26·5** × **20·4** mm.; minima **21·6** × **17·0** mm.

The breeding months are April, May and early June.

Habits. This little Barbet is almost entirely restricted to heavy humid forest in the breeding-season but at other times wanders into bamboo and deciduous jungle in the drier areas. They keep much to the taller trees, perching on a high branch when not feeding and frequently uttering their call of "turruk-turruk" many times repeated, and sometimes finishing off with a rolling "rrrroo." Each double call is invariably accompanied by a twist round of the head, so that, like the call of so many Barbets, it sounds very ventriloquistic, apparently coming first from one direction and

then another. This Barbet—and indeed all the species known to me in life—roosts on horizontal boughs, perching very upright like a passerine bird, never crouching close to a nearly vertical branch as Woodpeckers do. During the breeding-season both sexes sleep inside their nesting-hole. They are easy birds to keep in captivity and thrive on a mixture of boiled rice and plantain, varied with such other fruit as may be available and a few termites. In a wild state, however, they consume also small beetles, larvæ, etc.

(1442) Cyanops duvauceli stuarti.

THE TENASSERIM BLUE-EARED BARBET.

Mesobucco duvauceli stuarti Rob. & Kloss, Journ. Nat. Hist. Siam, v, p. 166 (October 1923) (Tapli, Peninsular Siam).
Cyanops cyanotis. Blanf. & Oates, iii, p. 95 (part).

Vernacular names. None recorded.

Description. Similar to the preceding bird but with the malar patch crimson, or nearly all of this colour; a black patch generally showing on the breast below the throat and the blue of the crown extending further back on the hind-crown.

Colours of soft parts as in the preceding bird.

Measurements. Wing 75 to 81 mm.; culmen 16 to 18 mm. Although there is little difference in size between this and the last race, the bill is decidedly smaller.

Distribution. Peninsular Burma and Siam, possibly extending into the extreme North of the Malay States.

Nidification. Bingham took two eggs of this Barbet in Tenasserim on the 12th February and Darling obtained three others on the 15th April near Tavoy. One hole was excavated in a big "pintado" tree in a cultivation clearing, the other in a small, rotten stump. The eggs varied in size between $1{\cdot}0 \times {\cdot}7''$ and $\cdot 85 \times \cdot 65''$ ($= 25{\cdot}4 \times 17{\cdot}8$ and $24{\cdot}6 \times 16{\cdot}5$ mm.).

Habits. Similar to those of the preceding bird.

(1443) Cyanops robustirostris.

THE THICK-BILLED BARBET.

Cyanops robustirostris Stuart Baker, Journ. Bom. Nat. Hist. Soc., x, p. 356 (1896) (N. Cachar Hills).

Vernacular names. *Dao-tukra kashiba* (Cachari).

Description. Whole plumage green; the ear-coverts and a narrow line across the forehead blue; fore-crown, over the eye and behind the eye brighter and more yellow; whole lower parts paler and suffused with blue, more strongly so on throat and breast; under aspect of tail bluish.

Colours of soft parts. Iris hazel to orange-brown; orbital skin dull blue; bill horny-black, tinged with yellowish-horny at the base; legs pale slate, claws almost black.

Measurements. Total length about 135 mm.; wing 78 mm. (*Peddie*), 80 mm. (*Rippon*) and 82 mm. (*Baker*); tail about 40 mm.; tarsus 19 mm.; bill at front 16·5 mm. and from gape 25 mm.; breadth at forehead 9·1 mm.

Distribution. N. Cachar. Col. Rippon obtained a specimen in Karenni which he attributed to this species and Mr. W. Peddie twice got specimens in the Naogang District of Assam, adjoining the North Cachar Hills.

Nidification. The only known eggs of this rare Barbet were taken by me on the 29th May—four eggs well incubated. The nest-hole was cut in the branch of a large Ficus, about 20 feet from the ground and overhanging a camp hut. The eggs measure 24·0 × 16·3 mm.; 23·8 × 16·4 mm.; 23·7 × 16·4 mm. and 23·5 × 16·2 mm., very much smaller eggs than those of any other Indian Barbet except *Xantholæma* occasionally.

Habits. Quite indistinguishable from those of *Cyanops d. cyanotis* as far as is known. Both Peddie and I found it in flocks of some size in the Winter, haunting fig and other fruit trees in dense forest or similar trees on the edge of forest roads and streams. In appearance they strike one as being much smaller than the Blue-eared Barbet, a fact which induced me to shoot my first specimen.

Cyanops franklinii.

Key to Subspecies.

A. Supercilium and lores black; ear-coverts grey .... *C. f. franklinii*, p. 124.
B. Supercilium, lores and ear-coverts mixed black and grey ..... *C. f. ramsayi*, p. 125.

(1444) Cyanops franklinii franklinii.

THE GOLDEN-THROATED BARBET.

Bucco franklinii Blyth, J. A. S. B., xi, p. 167 (1842) (Darjeeling).
Cyanops franklini. Blanf. & Oates, iii, p. 96.

Vernacular names. *Ban-basi*, *Bagh-basi* (Nep.); *Dao-yéala* (Cachari).

Description. Forehead and occipital patch crimson; centre of crown golden-yellow; lores, cheeks and supercilium black, the latter widening posteriorly; upper plumage grass-green, often strongly tinged with yellow; visible portions of wing green, passing into deep purple-blue on the shoulder and edge of the wing; wing-coverts edged with blue; primaries brown, all but the first edged with blue on the basal half outside and with

yellowish on the inner web; an orange spot at the base of the bill; chin and upper throat golden-yellow; ear-coverts, sides of head and lower throat silver-grey; lower plumage light yellowish-green.

Colours of soft parts. Iris brown; bill slaty-blue, the culmen and tip darker; orbital skin plumbeous; legs dull green or slaty-green.

Measurements. Wing 100 to 108 mm.; tail 57 to 64 mm.; tarsus 25 to 26 mm.; culmen 22 to 24 mm.

Distribution. Nepal and Sikkim to Eastern Assam, South Manipur, Lushai Hills and East to the Chin Hills.

Nidification. Hodgson says that this Barbet breeds in Nepal, Sikkim and the Terai from April onwards, whilst Mandelli took a nest with fresh eggs in early August. In the Assam Hills it breeds between 2,000 and 6,000 feet, most frequently between 3,000 and 4,500 feet. It seems to prefer for nesting purposes evergreen forest growing on broken, steep hillsides and, above all, gloomy ravines through which a stream runs, however small this may be. Any kind of dead tree or stump suffices and the entrance is usually made between six and twelve feet from the ground. The tunnel is nearly always short, a few inches only, and the tree selected is one rotten internally, so that little work is needed in excavating the chamber. The eggs number from two to five, generally three only. Fifty average 27·4 × 21·1 mm.: maxima **29·2** × 21·3 and 28·6 × **22·0** mm.; minima **25·0** × 20·0 and 26·0 × **18·8** mm.

The principal breeding months are May and June but I have taken fresh eggs on the 1st April and as late as the 26th July: possibly some birds have two broods.

Habits. This is a rather shy Barbet, keeping much to thickly-foliaged trees in deep forest; at the same time its constantly repeated wailing cry enables one to hunt it out very easily. Its call is not at all like that of the other species of *Cyanops* but is like that of *Megalaima*, a most melancholy cry of "pee-yu, pee-yu." The cock bird perches close outside the nest-hole when the hen is sitting and utters his wail with most persistent regularity, often giving away the site of his home to vermin, two-footed or otherwise. They are more purely frugivorous than most Barbets, only occasionally varying their diet with some soft grub or insect. I have never taken coleoptera or hard insects from their stomachs.

(1445) Cyanops franklinii ramsayi.

RAMSAY'S GOLDEN-THROATED BARBET.

Megalæma ramsayi Walden, Ann. Mag. Nat. Hist., xv, p. 400 (1875) (Karennee).
Cyanops ramsayi. Blanf. & Oates, iii, p. 97.

Vernacular names. None recorded.

Description. Differs from *C. f. franklinii* in having the lores, supercilium and ear-coverts mixed grey and black; the chin and

throat are generally paler yellow and the green of the back darker and less suffused with yellow.

Colours of soft parts as in the preceding bird.

Measurements. Wing 96 to 109 mm., generally under 103 mm.; culmen 21 to 23 mm.

Distribution. South Shan States; Central Burma from Karennee to Muleyit in Tenasserim, Siam. Birds from the Malay Peninsula have been separated by Kloss and Chasen as *C. f. minor* on account of their smaller size: wing 90 to 97 mm. as against 96 to 109 mm. in the present form.

Nidification. Apparently similar to that of the preceding bird. Three eggs taken by Col. Bingham in Tenasserim measure 31·3 × 19·8, 31·7 × 20·7 and 30·8 × 21·0 mm. respectively; they were taken on the 7th and 10th of May. Three other eggs taken by Hopwood at Nwalabo, Tenasserim, are smaller, measuring 27·0 × 20·0, 27·5 × 20·0 and 28·9 × 20·6 mm. These were taken on the 27th April at about 2500 ft. from a nest-hole bored about 20 feet up, near the top of a dead stump.

Habits. Similar to those of the preceding bird. Davison says that it is one of the noisiest of birds but does not describe its call.

Genus **XANTHOLÆMA**.

Xantholæma Bonaparte, Consp. Volucr. Zygod., p. 12 (1854).

Type, *Bucco hæmacephalus* Müller.

The genus *Xantholæma* differs from any other genus of Barbets found in India in having the second primary much longer than the 8th, 9th and 10th primaries and sometimes longer than the 7th and 6th also. The bill is short and stout with long rictal bristles reaching almost or quite to the tip; the naked orbital patch is small.

Key to Species.

A. Throat yellow, cheeks blackish	*X. hæmacephala*, p. 127.
B. Throat orange, cheeks blue	*X. rubricapilla*, p. 130.
C. Throat crimson	*X. malabarica*, p. 129.

Xantholæma hæmacephala.

Bucco hæmacephalus Müller, Natursyst., Anhang, p. 88 (1760).

Type-locality: Philippines.

Key to Subspecies.

A. Culmen 16 mm. or over	*X. h. hæmacephala.*
B. Culmen 15 mm. or under.	
a. Underparts more richly coloured ..	*X. h. indica*, p. 127.
b. Underparts greyer and less richly coloured	*X. h. lutea*, p. 128.

(1446) Xantholæma hæmacephala indica.

THE BURMESE CRIMSON-BREASTED BARBET.

Bucco indicus Lath., Ind. Orn., i. p. 205 (1790) (Calcutta).
Xantholæma hæmatocephala. Blanf. & Oates, iii, p. 98 (part).

Vernacular names. *Kat-Khora, Tambayat* (Hind.); *Chota bussunt bairi, Chota-benebo* (Beng.); *Hnet-padane* (Burm.); *Bussunt-sorai* (Assam).

Description. Lores, a line across the vertex, passing down behind the eye and eye-coverts, and malar region black; forehead and fore-crown crimson; a short broad supercilium and a broad patch below the naked orbital space, chin and throat bright yellow; occiput and sides of the neck slaty-green shading into olive grass-green on the upper parts, often tinged with yellowish, more especially on the rump; exposed portions of wings green, sometimes tinged with blue; primaries black, edged outwardly with bluish-green and inwardly with yellowish-white; a patch on the breast crimson; below this a faint yellowish patch, remainder of lower parts yellowish-white, boldly streaked with dark sage-green, the streaks less numerous on the centre of the abdomen.

Colours of soft parts. Iris hazel to dark brown; orbital skin brick-red to dull crimson; bill black; feet coral-red, claws black.

Measurements. Wing 77 to 89 mm.; tail 34 to 36 mm.; tarsus about 20 mm.; culmen 17 to 18 mm.

Young birds are much duller in general colour than the adult and want the crimson and black markings on the head.

Distribution. Eastern Bengal, Assam; Nepal, Sikkim Terai, the plains and foothills of Burma, Siam, Yunnan, the Malay Peninsula and Sumatra.

Nidification. The Burmese Crimson-breasted Barbet breeds in Assam from February to April, in Eastern Bengal from March to May, in Northern Burma about the same time, in Southern Burma in March and April and in Siam during February and March. In other respects its nidification differs in no way from that of its Indian cousin and no further description is required. Fifty eggs average 25·4 × 17·6 mm.: maxima **28·9** × 18·0 and 28·0 × **19·0** mm.; minima **23·2** × 17·5 and 27·6 × **16·5** mm.

Habits. Except that it is not nearly so common a bird as the Indian race, the Burmese form differs in no way from it. In Assam and Burma it is nowhere very numerous and even in Eastern Bengal it is not so common as its confrère is in the West. In and round about Bangkok, however, Herbert found it very numerous in all the gardens, orchards and cultivated parts.

(1447) Xantholæma hæmacephala lutea.

The Coppersmith

THE INDIAN CRIMSON-BREASTED BARBET.

Bucco luteus Lesson, Traité d'Orn. p. 163, 1831 (Pondicherry).
Xantholæma hæmatocephala. Blanf. & Oates, iii, p. 98 (part).

Vernacular names. *Phouk-Bussunt* (Manbhum); *Bussunt lisora* (N.W.P.); *Juktuk* (Mahr.); *Tokoji* (Tel.); *Kokoorupan* (Tam., Ceylon); *Kotoruwa*, *Mal-Kotoruwa* (Cing.).

Description. This form differs from the preceding only in being less richly coloured below; the green stripes are more grey and not so deep in tone, whilst the rest of this colour of the lower parts is almost white, only faintly washed with yellow.

Colours of soft parts as in the Burmese form.

Measurements. Wing 73 to 89 mm.

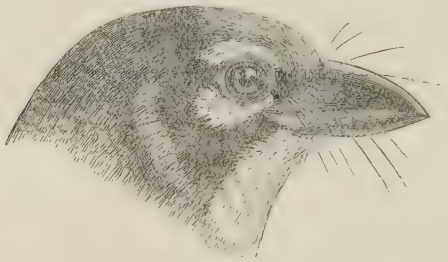

Fig. 19.—Head of *X. h. lutea.*

Distribution. Ceylon and practically the whole of India to the foothills of the Himalayas; East to Western Bengal, specimens from Manbhum being of this race. It is said to be rare in the Punjab, Sind and Cutch and also in the heaviest rainfall areas of Ceylon and the West coast of India.

Nidification. The Coppersmith, as it is usually called in India, breeds principally in February, March and April in South India; in Northern India it has a very prolonged breeding-season, for though most birds lay between March and May, eggs have been taken in Poona as early as the 15th January by General Betham and in Lucknow as late as October by Jesse. Almost any tree in almost any position may be selected for the nest-hole; isolated trees in cultivated land, mango-trees in an orchard or trees in gardens, by roadsides or in towns and villages, also serve for this purpose at different times. Generally the entrance is made on the underside of a bough somewhere between 6 and 16 feet from the ground, a rotten or semi-decayed branch being chosen for the purpose. The eggs number two to four and are typical of the family but perhaps average longer in proportion to their size. Fifty eggs average 25·0×17·7 mm.: maxima 28·0×17·0 and

27·9 × 18·9 mm.; minima 23·0 × 17·2 and 24·6 × 15·9 mm. Incubation apparently takes 12 days and both sexes assist in the duty.

Habits. This little Barbet, with its monotonous call of "tonk, tonk, tonk," uttered with wearisome persistence through the hottest hours of the hottest days, is one of the first birds to force itself upon the notice of Europeans in India. Its notes are metallic, sounding much like blows on an anvil, and very ventriloquistic, the bird moving its head from side to side with each note. During the breeding-season it also calls frequently during moonlight nights. It is said to subsist almost entirely on wild Fici of kinds but, as a matter of fact, it feeds greedily on ripe guavas and other soft cultivated fruit and I have myself seen it feeding on ripe custard apples; it also devours a few soft grubs and insects. When hunting for a nesting-site it clambers about the trunks of trees much like a Woodpecker, tapping constantly for soft wood, whilst, when actually excavating the entrance, Inglis observes that it uses its soft, flexible tail as a support in the same manner the Woodpecker employs its specially-adapted stiff tail. Coppersmiths are solitary birds except during the breeding-season, though they sometimes collect in considerable numbers on trees which have ripe fruit. Their flight is fairly strong and fast but dipping and laboured in appearance.

(1448) **Xantholæma malabarica.**

THE CRIMSON-THROATED BARBET.

Bucco malabaricus Blyth, J. A. S. B., xvi, pp. 386, 465 (1847) (Malabar).
Xantholæma malabarica. Blanf. & Oates, iii, p. 99.

Vernacular names. *Tokoji* (Tel.).

Description. A band across the vertex and a narrow line from the lores across the forehead black; forehead and fore-crown, feathers below the eye, malar spot, chin, throat and fore-neck crimson; nape to back, wings and tail as in *X. h. indica*; a very narrow line of black divides the crimson cheeks from the malar spots; sides of head blue, blackish next the suborbital crimson patch; upper breast black with crimson apical streaks; remainder of lower parts pale green, golden-yellow next the black and crimson upper breast; the black bases of the feathers show through here and there on the lower breast, abdomen and flanks.

Colours of soft parts as in *X. h. lutea.*

Measurements. Wing 78 to 84 mm.; tail 37 to 39 mm.; tarsus 17 to 18 mm.; culmen 17 to 18 mm.

Young like the adult but duller and the whole head green.

Distribution. From South Travancore to Ratnagiri, East to Mysore, Wynaad and Palni Hills. A specimen in the British

Museum labelled Madras is probably from the extreme West of the Province and not from Madras city.

Nidification. This Barbet breeds, as far as is known at present, only during February and March, laying two or three eggs similar to those of the preceding bird. Nine eggs in my collection average 24·7 × 17·7 mm.: maxima **26·4 × 18·8** mm.; minima **23·0 × 17·3**.

Habits. Very similar to those of the Coppersmith, with an equally monotonous but rather softer call.

(1449) Xantholæma rubricapilla.

THE SMALL CEYLON BARBET.

Bucco rubricapillus Gmelin, Syst. Nat., i, p. 408 (1788) (Ceylon).
Xantholæma rubricapilla. Blanf. & Oates, iii, p. 100.

Vernacular names. *Mal-kotoruwa* (Cing.); *Sosina-kukuruvan* (Tam.).

Description. Similar to *X. malabarica* but with the chin, throat, supercilium and suborbital patch orange-yellow instead of crimson; the crimson patch on the fore-neck and the remaining lower parts are as in that bird.

Colours of soft parts. Iris red-brown; bill black; legs and feet coral-red.

Measurements. Wing 75 to 78 mm.; tail 33 to 35 mm.; tarsus about 17 to 18 mm.; culmen 13 to 15 mm.

Nestlings are indistinguishable from those of the preceding race but young birds soon show the yellow suborbital patch.

Distribution. Ceylon only.

Nidification. Wait gives the principal breeding months as March to June but Jenkins obtained most of his eggs in January and February. They excavate their nest-holes both in dead branches of living trees and in dead stumps but the favourite nesting-sites seem to be in dead coconut-trees, often so rotten that climbing them is impossible. According to Jenkins this Barbet uses the same egg-chamber several years running but each season makes a new entrance. The only ten eggs I have been able to measure average 25·1 × 18·1 mm., due to one abnormally large clutch of three: maxima **28·0 × 19·0** mm.; minima **24·3** × 18·8 and 24·4 × **16·6** mm.

Habits. Very similar to those of other species of the genus but this bird seems to be found far more often in forest, though it also haunts gardens and cultivated country.

According to Wait its call is quicker and sharper than that of the Coppersmith.

Family INDICATORIDÆ.

Bill short, stout and well curved; tail-feathers twelve in our Indian species; wing long and pointed, with only nine primaries; ventral feather-tract forked on the throat but not on each side of the breast.

The palate is ægithognathous but presents features reminiscent of that of the Woodpeckers; thigh-muscles as in the *Capitonidæ*. The syrinx is peculiar inasmuch as it is formed of a number of tracheal rings welded together to form a tube, working in conjunction with an enlarged first pair of bronchial semi-rings, to which the intrinsic muscles are attached.

Since Garrod, forty-seven years ago, made dissections of *Indicator*, little more has been done and information regarding the nestling, both in regard to its skeleton as well as external features, are needed.

Genus INDICATOR.

Indicator Vieill., Analyse, p. 28 (1816).

Type, *Cuculus indicator* Gmelin.

Characters those of the Family.

(1450) Indicator xanthonotus.

THE YELLOW-BACKED HONEY-GUIDE.

Indicator xanthonotus Blyth, J. A. S. B., xi, p. 166 (1842) (Darjeeling); Blanf. & Oates, iii, p. 81.

Vernacular names. None recorded.

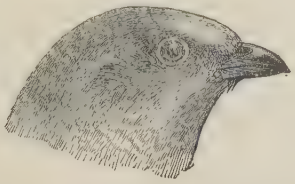

Fig. 20.—Head of *I. xanthonotus*.

Description. Forehead and cheeks glistening orange-yellow; lores blackish; crown, nape and neck olive-brown, the feathers of the crown with dark brown centres; back, scapulars and wing-feathers very dark brown, all except the primaries and primary-coverts narrowly edged with olive-yellow; inner webs of outer secondaries edged with whitish; tail blackish-brown, the outermost pair, or two pairs, of feathers with pale tips and shafts

varying greatly in extent; chin and throat grey washed with yellow; breast dark brown with broad dark grey edges to each feather; abdomen and posterior flanks with darker centres and paler, white edges; under tail-coverts almost black with broad white edges and tips; under wing-coverts and axillaries buffy-white or white, sometimes marked with brown; edge of wing mottled brown and white.

Colours of soft parts. Iris brown; orbital skin pale green; bill yellow, ashy at the tip; legs and feet pale greenish-horny (*Stoliczka*).

Measurements. Total length about 150 mm.; wing, ♂ 92 to 96, ♀ 82 to 83 mm.; tail 56 to 61 mm.; tarsus 13 to 14 mm.; culmen about 8 to 9 mm.

Distribution. Murree, Sikkim, Abbottabad. Hume obtained it from as far West as Hazara on the Afghan frontier, and I saw it once at Margherita in Eastern Assam. Probably, therefore, it extends throughout the Himalayas, though it seems to be of extreme rarity everywhere.

Nidification. Unknown but presumably it lays its white eggs in nest-holes of Woodpeckers and Barbets as the African species do. It has been suggested that the Honey-Guide is parasitic on Barbets, depositing its eggs in occupied nest-holes.

Habits. Very little known and that little does not show that our Indian bird ever acts as a guide to bees' nests in the manner which has earned the African birds their title. It has a heavy dipping flight like the larger and more clumsy Barbets and, like these birds, when perched sits motionless and very upright, though it utters no sound. Although normally a frequenter of heavy forest, it is not shy and one seen by Stoliczka in Dunga Gali and the one seen by Dr. H. W. Coltart and myself took no notice of the watchers, though, in the latter case having no gun, we sat and watched it for a long time before it flew off. They feed on hymenoptera and possibly other insects. Magrath saw one busily feeding on bees as they swarmed from a hole in a forest tree. He remarks on the Honey-Guide that "the attitude in a tree is very Dove-like. It sits with head sunk on breast, feathers rather puffed out and wings drooping so as to display the vivid yellow patch down the lower back." He adds: "It is, I think, rarely to be found far from water."

Suborder CUCULI.

This Suborder is distinguished from all other zygodactylous groups, except the Parrots, by possessing the Ambiens muscle and in having the deep plantar tendons arranged as in the Gallinaceous birds, only differing in the two being joined by a vinculum; the *flexor longus hallucis* leads to the hallux alone, the *flexor perforans digitorum* serving the other three toes. The palate is desmognathous, lacking the basipterygoid process, the vomer is vestigial or wanting and the mesial borders of the palatines meet in the middle line, concealing the pre-sphenoidal rostrum.

The *Cuculi* contain two families: the *Cuculidæ* and the *Musophagidæ*; the latter, however, is entirely African and not represented within Asiatic limits. In the former the pre-coracoid is not fused with the acro-coracoid and the furculum has no facet for articulation with it, whilst the anterior border of the sternum is not continued forward as far as the free end of the spina externa.

The Suborder has been split into several groups by Beddard ('Structure and Classification of Birds') upon the pterylosis and syrinx, and by Pycraft (P. Z. S. 1903), who bases his divisions on the osteology and the syrinx; but for the purposes of this work it suffices to divide the Suborder into the families referred to above.

Family CUCULIDÆ.

Feet zygodactyle, the first and fourth toes directed backwards; both carotids present; contour-feathers without any aftershaft; dorsal feather-tract divided between the shoulders and enclosing a lanceolate naked space on the back; a nude oil-gland present; young hatched naked and not passing through a downy stage before acquiring feathers. Tail-feathers ten in number in all Oriental genera.

Our Indian Cuckoos fall into two general groups—the one arboreal and parasitic, *Cuculinæ*, and the other terrestrial and non-parasitic, *Phœnicophainæ*; but there is one genus, *Eudynamis*, parasitic and arboreal, which has generally been placed with the latter on account of its structural affinities. This genus and perhaps *Clamator*, of which we require to know much more, seems to form an intermediate group which deserves recognition.

Key to Subfamilies.

A. Tarsus more or less feathered anteriorly; no accessory femoro-caudal muscle .... *Cuculinæ*, p. 134.

B. Tarsus naked; accessory femoro-caudal present.

a. Plumage of head and shoulders not spiny; habits arboreal and parasitic .. *Eudynaminæ*, p. 172.

b. Plumage of head, or of head and shoulders spiny; habits terrestrial and not parasitic..... *Phœnicophainæ*, p. 175.

Subfamily CUCULINÆ.

This Subfamily contains the true Cuckoos, all of which are parasitic. The accessory femoro-caudal muscle is absent and the pterylosis shows a simple undivided band of feathers on either side of a naked pectoro-ventral tract.

The tarsus is comparatively short and feeble and is feathered in front, though in *Clamator* the tarsi are longer and stouter and the feathering is confined to the top in front. The wing is moderate but never much rounded and in most genera fairly pointed; the plumage is close and firm but not spiny and the tail, except in *Clamator*, is almost the same in length as the wing.

Key to Genera.

A. No crest; tarsus feathered throughout in front.

a. Secondaries in closed wing scarcely exceeding half the length of the primaries. CUCULUS, p. 135.

b. Secondaries two-thirds length of primaries or more.

a'. Tail rounded and graduated.

a''. Larger, wing exceeding 150 mm.; tail with 3 or 4 black cross-bands.. HIEROCOCCYX, p. 146.

b''. Smaller, wing under 130 mm.; tail with no cross-bands or with more than 4.

a^3. Plumage wholly non-metallic.

a^4. Bill compressed; tail-feathers the same length throughout .. CACOMANTIS, p. 153.

b^4. Bill stout and not compressed; tail-feathers narrower posteriorly ..... PENTHOCERYX, p. 157.

b^3. Plumage partly metallic ..... CHALCITES, p. 160.

b'. Tail square or forked ..... SURNICULUS, p. 163.

B. Head crested; tarsus only feathered at the top..... CLAMATOR, p. 167.

Genus CUCULUS.

Cuculus Linn., Syst. Nat., 10th ed. i, p. 110 (1758).

Type, *Cuculus canorus* Linn.

In this genus of Cuckoos the wing is long and pointed; the first primary is about two-thirds the length of the third, which is longest, exceeding the secondaries by half, or nearly half its length; the tail is long, yet shorter than the wing, with the feathers well graduated; the bill is moderate in size, the gape exceptionally large and flexible; the plumage in adults is chiefly ashy-grey or ashy-brown above, barred below; the young pass through more than one phase before assuming adult plumage. The sexes are alike or nearly so.

The true Cuckoos have a very wide range, extending over Europe, Asia, Africa and Australia. Four species are found within the limits of this work.

Key to Species.

A. No subterminal black band to tail.
  a. Edge of wing mixed brown and white .. *C. canorus*, p. 135.
  b. Edge of wing white ..... *C. optatus*, p. 140.
  c. Edge of wing ashy..... *C. poliocephalus*, p. 142.
B. A broad black subterminal band on tail .. *C. micropterus*, p. 144.

Cuculus canorus.

Key to Subspecies.

A. In colour above intermediate; barring on lower plumage also intermediate in breadth ..... *C. c. canorus*, p. 135.
B. Above palest; barring on lower plumage finer and less black..... *C. c. telephonus*, p. 136.
C. Above darkest; barring on lower plumage broader, dark bars very black..... *C. c. bakeri*, p. 139.

(1451) Cuculus canorus canorus.

THE EUROPEAN CUCKOO.

Cuculus canorus Linn., Syst. Nat., 10th ed. i, p. 110 (1758) (Sweden); Blanford & Oates, iii, p. 205 (part).

Vernacular names. As in the next bird.

Description. Similar to the next-described bird but generally darker above with coarser barring below and more bars of black on the under tail-coverts.

Colours of soft parts as in *C. c. telephonus*.

Measurements. "Wing, ♂ 216 to 228 mm.; tail 165 to 180 mm.; tarsus 18 to 24 mm.; bill from skull 24 to 28 mm.; ♀ wing 200 to 223 mm." (*Witherby*); "wing, ♂ 211–227 mm., ♀ 209–219 mm." (*Ticehurst*).

Young birds in their various forms are not distinguishable from the Asiatic Cuckoo.

Distribution. Practically all Europe within the Arctic Circle, Western Asia. In Winter South to Northern Africa, Arabia, Persia and North-West India.

Nidification. Breeds nowhere within the limits of this work. In Europe deposits its eggs in the nests of other birds, sometimes laying them direct into the nest, at others placing them in the nest, presumably by the bill, after they have been laid elsewhere. The eggs vary considerably. In England a general type of egg has been produced which goes fairly well with the eggs of the Pipit, Wagtail or Reed-Warbler, all favourite fosterers. It, however, agrees less well with the eggs of the Robin and not at all with those of the Hedge-Sparrow. On the Continent blue eggs have

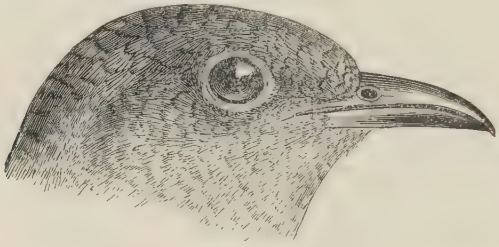

Fig. 21.—Head of *C. c. canorus.* $\frac{1}{1}$.

been evolved to suit those of the Redstart, and others almost equally advanced in evolution to match the eggs of Shrikes and Reed-Warblers. Six hundred and twenty-six eggs average 22·4 × 16·5 mm.: maxima **25·5** × 17·8 mm. and 25·0 × **18·1** mm.; minima **20·0** × 15·5 and 20·7 × **14·7** mm. (*Rey*).

Habits. Similar to those of the next bird. It is very difficult to say to what extent the European Cuckoo comes into India during the Winter but certainly a very large number of specimens from that country in the British Museum collection cannot be distinguished from it. These come from the North-West Provinces, Punjab, United Provinces, the North of the Central Provinces and Northern Bombay Presidency. Ticehurst considers all the Punjab specimens in his and Whistler's collection to be of this race.

(1452) Cuculus canorus telephonus.

THE ASIATIC CUCKOO.

Cuculus telephonus Heine, Journ. f. Orn., p. 352 (1862) (Japan).
Cuculus canorus. Blanf. & Oates, iii, p. 205 (part).

Vernacular names. *Phuphu* (Hind., Dehra Dun); *Kupwah* (Kuman); *Kukku* (Lepcha); *Akku* (Bhut.).

Description.—Male. Whole upper plumage and wing-coverts

ashy-grey, the rump and upper tail-coverts almost always a purer, lighter grey; wing-quills and concealed portions of greater coverts browner, the quills with a slight gloss and barred with white on the inner webs of the outer primaries, turning to rufous on the inner primaries; tail ashy-black tipped with white and with white notches along the sides of the shafts, the white more in extent on the lateral than on the central feathers; chin, throat, sides of the head and neck and upper breast ashy-grey, much paler than the back; remainder of lower parts, axillaries and under wing-coverts white with narrow rather irregular bands of black, wider apart on the under tail-coverts.

Colours of soft parts. Iris pale to deep yellow; bill dark horny-brown, paler and yellowish at the base and on the commissure and orange-yellow on the gape; legs and feet wax-yellow.

Measurements. Wing 220 to 227 mm.; tail 155 to 178 mm.; tarsus about 19 mm.; culmen from feathers of forehead 20 to 22 mm.

Female differs in having a rufous tinge on the upper breast and sometimes on the throat and sides of the neck.

Nestling, naked. First plumage brownish-grey or slate obsoletely barred with buffish-white, a patch of white on the hind-neck; chin, throat, breast and underparts barred white or rufous-white and dark brown, very heavily on chin and throat, lightly so on the vent and under tail-coverts.

Young male like the adult but nearly always with traces of the juvenile plumage, more especially on the wings.

Hepatic females have the whole upper plumage barred chestnut and blackish-brown; the lower plumage is like the normal female but has the chin, throat and upper breast barred pale chestnut and blackish and generally with a strong tinge of rufous on the breast and abdomen.

Young Hepatic females are like the adult bird of that type but duller in colour, with a considerable amount of white fringing to the feathers of the upper parts.

Distribution. Northern Asia from West Siberia to Kamschatka, Korea, Manchuria and Central Asia, South to the Himalayas from Afghanistan and Gilgit, through Tibet, Western China and the higher ranges of Mountains to Pekin.

In Winter over the whole of India, Ceylon, the Indo-Chinese countries to extreme East of South China, the Malayan Archipelago to the Moluccas and New Guinea. It also wanders into Palestine and South-East Africa.

Nidification. In addition to the breeding-range given above this Cuckoo undoubtedly breeds sometimes, if not regularly, in the hill ranges of Southern and Central India. Betham found it breeding in the broken country near Mhow; Blanford and others found it during April, May and June between Chota Nagpore and the Godavery; McMaster observed it near Saugur, Khamptee and

Chikalda; Adams saw it at Sambhur and, finally, Butler believes it to breed on Mount Aboo. In the Himalayas it breeds freely between 7,000 and 12,000 feet from the end of May to early July. The favourite fosterers seem to be the Forktails and the Shrike, *Lanius l. erythronotus*, in Simla and in Garhwal, as well as the Ruby-throat, Indian Bushchat and the various Larks, Pipits and Wagtails. In Kuman, Mussoorie, and Murree the birds most often cuckolded are the Bushchats, *Trochalopterum lineatum* and *Larvivora brunnea*, and a beautiful blue egg has been evolved exactly similar in tint to those of the latter. Magrath also obtained a blue egg from the oviduct of a female. Evolution in the subspecies seems to have advanced to a stage in which the eggs of the Forktails, Shrikes, Ruby-throats and *Larvivora* have almost reached perfection. At the same time, many other birds' nests have been found to contain Cuckoos' eggs totally unlike that of their own and these are probably only casual deposits, made use of because the one desired is not available.

The eggs average much larger than those of the European Cuckoo and are broader in comparison with the smaller end less pointed; in texture they are similar and, like most other Cuckoos' eggs, are heavy for their size with a very stout coarse shell. They average about $23{\cdot}6 \times 18{\cdot}1$ mm. Incubation lasts 12 to 14 days.

The hen Cuckoo is undoubtedly polyandrous or, perhaps it is more true to say, where Cuckoos are especially numerous, both sexes are quite indiscriminate in their love affairs. On the other hand, where there are but few Cuckoos a pair will sometimes continue in each other's company indefinitely.

Habits. The Asiatic Cuckoo is a truly migratory race, arriving in the plains of India in the early part of August to September, a few belated birds arriving in October. The call is not distinguishable from that of the typical form, a musical double note from which it derives its name. The female normally calls with a loud rippling or bubbling note during the mating-season but at other times is very silent. The male calls from April to the end of July, the call being broken and imperfect both at the end and the beginning of the breeding-season. The flight of this Cuckoo is very rapid, powerful, direct and singularly Hawk-like. During the breeding-season it appears to feed almost exclusively on soft caterpillars of all kinds but at other times it will eat any soft insects, grubs, larvæ, etc. and, less often, hard-shelled coleoptera, woodlice, etc. It returns to the Himalayas and Northern Asia in early April and May, a few birds remaining to breed in the Southern Hills.

Call = Cuckoo

Many with Eggs & Pairs at 12,000 ft

(1453) Cuculus canorus bakeri.

THE KHASIA HILLS CUCKOO.

Cuculus canorus bakeri Hartert, Vög. Pal., ii, p. 948 (1912) (Shillong, Khasia Hills).
Cuculus canorus. Blanf. & Oates, iii, p. 205.

Vernacular names. *Kuku* (Khasia).

Description. Similar to the preceding bird but darker above, often a blackish-slate, and with the bars on the lower surface broader and further apart.

Colours of soft parts as in *C. c. telephonus.*

Measurements. Wing in an exceptionally small female 208 to 240 mm. in the largest males; most specimens of both sexes vary between 225 and 235 mm.

The Female differs from the male in exactly the same way and degree as that of the Asiatic Cuckoos but I have seen no females of the Hepatic type.

Young birds are not distinguishable from those of the other races.

Distribution. Breeding in Assam South of the Brahmaputra through the Chin and Kachin Hills to the Shan States and Yunnan, South to Karenni and the Pegu Yomas. In Winter South to the Assam Plains and Eastern Bengal; Northern Burma and the Indo-Chinese countries.

It is extremely difficult to give the Winter range of the various forms of *C. canorus*, as these overlap so widely. From the end of July to early April *C. c. telephonus* may be found over the whole of the breeding-range as well as the winter quarters of *C. c. bakeri*, whilst *C. c. canorus* also comes into India in the North-West, thus overlapping the Winter quarters of *C. c. telephonus*. Young birds are quite indistinguishable from one another and even fully adult birds in any but fresh plumage are often hard to determine. On the other hand, breeding birds do show quite clearly that the races are separable and it is noteworthy that these races follow the usual rule, *i. e.* there is a pale form in the higher, colder and drier regions and a darker, more sedentary, form in the lower, hotter and more humid areas.

Nidification. In the Khasia Hills the Cuckoo commences to breed in small numbers in early April and continues throughout May and early June and then in lessening numbers until the end of July and early August. In Burma, Harington, Wickham, Mackenzie and others found it laying principally in May but eggs were seen in April and June also. In the Khasia Hills nine eggs out of every ten, or more, are placed in the nests of birds of the genera *Cisticola* and *Suya*, which make little domed nests of grass with small entrances into which no Cuckoo could even get her whole head; their eggs are in these cases, without doubt, deposited by the bill. Two forms of eggs have been evolved for

these fosterers—one pure white sparsely speckled with dark reddish, the other dull reddish profusely speckled with spots or clouds of darker reddish. The first of these agrees well in all but size with the eggs of *Cisticola*, and the latter with a common type of those of *Suya*. Intermediate eggs are very common. Blue eggs, immaculate or speckled, have been evolved to go with the eggs of *Mesia*, *Leiothrix*, *Leioptila*, *Saxicola*, etc., and are normally deposited in the nests of these birds. Another favourite fosterer is *Anthus rufulus*, with which a dark egg similar to the darkened *Suya* type is deposited. Other eggs resemble those of Shrikes, Forktails, Thrushes of the genera *Monticola*, (*Petrophila*) *Niltava*, etc., and are placed with such. Abnormally the eggs may be placed in almost any nest, even in such unsuitable positions as in those of the tiny *Abrornis*, in narrow bamboos in which no young Cuckoo could survive even if hatched.

The largest number of eggs I have seen laid in one season by one Cuckoo is fourteen, but they may well lay more, as the jungles are too difficult to work to insure all the possible fosterers' nests being found. Several females occupy the same area for the deposition of their eggs but in such cases each Cuckoo usually cuckolds a different fosterer. Thus I have myself taken eggs of three different Cuckoos in the nests of *Cisticola*, *Niltava sundara*, and *Leiothrix l. calipyga* within fifty yards of one another and in the same strip of jungle.

Three hundred eggs average 24·2 × 17·9 mm.: maxima **26·9** × 18·3 and 25·4 × **19·3** mm.; minima **21·0** × 17·1 and 22·4 × **16·2** mm.

Incubation apparently takes from 11 to 14 days. A nest containing three eggs of *Cisticola f. cursitans* on the 10th May, when visited on the evening of the 27th, had three Warbler chicks and a young Cuckoo just emerging. Another egg laid in a Pipit's nest on the 14th May did not hatch until the 28th.

The sexes do not pair and receive the attentions of the opposite sex indiscriminately.

Habits. This race of Cuckoo differs from the others in being more sedentary. Many birds remain in their breeding-haunts throughout the year, whilst others merely move into the adjoining plains. It is also a more exclusively forest bird and will seldom be seen in very open country, except as it passes from one patch of forest to another. In other respects—flight, voice, food, etc.—its habits call for no remark.

(1454) Cuculus optatus.

THE HIMALAYAN CUCKOO.

Cuculus optatus Gould, P. Z. S., 1845, p. 18 (Port Essington, Australia).
Cuculus saturatus. Blanf. & Oates, iii, p. 207.

Vernacular names. *Tong-ting-vyang* (Lepcha); *Dao-hoo-hoo* (Cachari); *Hoo-Kuku* (Khasia).

Description. Similar to *C. c. telephonus* but with the edge of the shoulder of the wing pure white and not barred; the black bars on the lower parts are wider apart and bolder in appearance.

Colours of soft parts. Iris yellow; bill dark horny-green, the bars of the upper and most of the lower yellowish-horny, the gape more yellow; legs and feet wax-yellow to rather bright yellow.

Measurements. Wing 208 to 226 mm.; tail 151 to 176 mm.; tarsus about 20 to 21 mm.; culmen 20 to 22 mm.

The Female is similar to the male but generally has more rufous tinge on the breast and underparts; the under tail-coverts are usually pale fulvous with black cross-bars.

The female has a Hepatic phase like that of *C. canorus*.

Young birds in first plumage are blackish-brown above, the feathers all broadly edged with white; the wing-quills barred with rufous on the outer webs; the chin, throat and breast are blackish, narrowly fringed with white and the rest of the lower parts white, or faintly fulvous-white, heavily barred with broad bands of black.

In second stage the plumage is slaty, the feathers very narrowly edged with white; below, the chin, throat and upper breast is blackish with broad fringes of white and the remainder of the lower parts like the male.

Hepatic young are like the Hepatic female adult but less richly coloured and more heavily banded below with blackish, especially on the chin, throat and breast. Some individual young specimens in the British Museum collection seem to be changing from a juvenile Hepatic condition to a normal adult plumage.

The white nuchal spot is rare in the young of this Cuckoo but is sometimes present.

Distribution. Breeding from Central to extreme East Siberia and possibly Japan. South it breeds in the mountains of Central Asia, through Persia to the Himalayas and is a resident bird throughout the Himalayas to Eastern Assam and the hills of Northern Burma to Eastern China. In the Winter it wanders into the plains of the North-West and has been obtained at Lucknow, Jodhpore, Fategarh, Bihar, Dibrugarh and Cachar. In Burma it extends south to Tounghoo and has been obtained in the Andamans and Nicobars and ranges thence through the Malayan Peninsula and Islands to New Guinea and Australia.

Nidification. The Himalayan Cuckoo breeds within our limits from the North-Western boundaries of Kashmir to the extreme East of the Himalayas. In India several oviduct eggs have been taken by Rattray and one by Brooks. All these were pure white, very sparsely speckled with tiny spots of black and, so far, this is the only type of egg which can with certainty be attributed to this Cuckoo. It breeds in May and June at elevations between 5,000 and 10,000 feet, depositing its egg in the domed nests of birds of the genera *Phylloscopus* and *Acanthopneuste*. An egg, almost

certainly of this Cuckoo, taken in the nest of *Enicurus schistaceus*, is similar to that described but has a pale greenish ground, whilst another from a nest of *Orthotomus* has a pale pink tinge and is fairly profusely marked with reddish. In shape all the eggs are long ellipses, practically equal at either end. Thirty-four eggs average about 21·0 × 13·6 mm.: maxima **25·4 × 16·4** mm.; minima **19·7 × 13·0** mm.

In China, Messrs. Ricketts, Styan and La Touche took eggs of this Cuckoo of three types, the first similar to that already described, the second a pale grey-blue flecked with red, very similar to the eggs of *Saxicola torquata*, with which they were deposited and, thirdly, reddish in ground-colour, heavily blotched with deeper red like the eggs of *Pyctorhis*, in the nest of which they were obtained. In shape these eggs are also elliptical.

May and June are the two principal breeding months but though the Cuckoo is very common in many places, the eggs are very hard to find, possibly because these Cuckoos themselves select as fosterers birds which conceal their nests very carefully.

Habits. The habits of these Cuckoos are very similar to those of the Common Cuckoo but it keeps more to densely-foliaged trees and is less often seen, though its loud call, consisting of four deep hoots preceded by a single high note, may be heard all round one. In flight and food it differs from *C. canorus* only in being more varied in its diet, eating almost any kind of soft insect and many quite large and very indigestible looking beetles. They also swallow the eggs they extract from other birds' nests in place of their own.

It is not migratory in the true sense of the word but visits the plains adjacent to its breeding ground in Winter. It begins to call, a broken double hoot, in early April and is in full voice from the end of that month to the middle of July.

(1455) Cuculus poliocephalus poliocephalus.

THE SMALL CUCKOO.

Cuculus poliocephalus Lath., Ind. Orn., p. 214 (1790) (Srinagar); Blanf. & Oates, iii, p. 208.

Vernacular names. *Dang-hlem* (Lepcha); *Pichu-giapu* (Bhutea); *Dao-pia-pihu* (Cachari).

Description. Similar to the Common Cuckoo but with the bars on the under surface bolder and wider apart. The breast, abdomen, flanks and vent are almost invariably suffused with buff.

Colours of soft parts. Iris brown; eyelids yellow; bill blackish-horny, the base of both mandibles, commissure and gape yellow; legs and feet wax-yellow to tan-yellow.

Measurements. Wing 152 to 171 mm.; tail 132 to 149 mm.; tarsus about 18 to 19 mm.; culmen about 17 to 19 mm.

Young birds in first plumage only differ from those of *C. optatus* in being smaller and in having the wing-quills barred with pure white rather than with rufous.

Young in the second stage have narrower white edges to the feathers, a white nuchal spot is generally attained and the chin and throat are barred pale rufous and blackish-brown.

Young in the third stage are bright chestnut barred with black but with the black bars sometimes absent or obsolete on the head and neck; chin, throat and upper breast as in the second stage and remainder of lower plumage as in the adult.

It is possible that this chestnut plumage is not invariably assumed, as two specimens in the British Museum collection appear to be changing direct from the dark brown into the adult plumage

From the third or chestnut stage the young moult by degrees into the fully adult grey plumage.

Distribution. Breeding from Gilgit and the Afghan frontier through the Himalayas and mountains of Central and North China to Japan. In Winter South to Ceylon and practically the whole of India, the Indo-Chinese countries and Malay Peninsula and South China.

It breeds in the Sub-Himalayas South of the Brahmaputra and almost certainly in the higher ranges of North Burma and Yunnan.

Nidification. The Small Cuckoo breeds all along the Himalayas from Kashmir to Eastern Assam and throughout the mountains of Central China to Manchuria and Japan. In India it commences to breed at the end of May and continues to lay up to the end of July at any elevation between 4,500 and 10,000 feet or higher. It lays two types of eggs—one pure white, the other varying from pinkish-chestnut to deep chocolate. In Japan and China the latter type only is laid, whilst in the extreme West the white alone is found but from Garhwal to Assam both types occur. The brightest chestnut eggs are obtained in Japan, where they are, practically without exception, deposited in the nests of *Cettia*, which lays eggs of exactly the same colour. In the Himalayas the normal fosterers for the chocolate eggs are species of *Horornis*, which also lay dark chocolate eggs and, more rarely, *Tesia castaneiventris*, which lays dark pinkish eggs. White eggs are normally placed in the nests of *Phylloscopus, Acanthopneuste, Pnoepyga* and other genera, which lay eggs either pure white or white slightly speckled with darker colours. In shape the eggs are ellipses, the white ones generally longer and more narrow than the chocolate; the texture is close and fine with a slight gloss, more especially in the Japanese eggs. Thirty eggs average 21·0×14·2 mm.: maxima 23·0×15·5 mm.; minima 19·5×13·5 mm.

Habits. The Little Cuckoo is quite typical of the genus in every way. It haunts both open, well-wooded country and forest but

prefers deep and broken ravines in evergreen forest. Its note is a not very musical "pi-pi, pi-pi-yu," the scale of notes ascending. It is not however so noisy a bird as the larger Cuckoos and often occurs without being heard for some hours. Its flight is swift and even but it keeps so much to densely-foliaged trees that it is seen but little more than it is heard. It is a true migrant, leaving the hills in September and early October and spreading over practically the whole of the plains. It returns to its breeding-haunts at the end of April and early May and commences calling about the middle of the latter month. I took from the stomach of one specimen a mass of small blue coleoptera and from another a similar semi-digested mass of tiny bees.

(1456) Cuculus micropterus micropterus.

THE INDIAN CUCKOO.

Cuculus micropterus Gould, P. Z. S., 1837, p. 137 (Himalayas; restricted to Simla-Almora Districts); Blanf. & Oates, iii, p. 210.

Vernacular names. *Bo-kota-ko* (Beng.); *Takpo* (Lepcha); *Kang-ka-tong* (Bhut.); *Kyphul-pakka* (Mussoorie); *Kupul-pukki* (Chamba); *Naflang-kai-ko* (Cachari).

Description. Sides and upper head and neck dark ashy-grey, the lores, chin, throat and upper breast a paler grey; remainder of upper plumage rich brown; primaries barred on the inner webs with white; tail-feathers tipped white and with a broad subterminal band of black, the shafts of the central retrices notched with white and the edges with rufous; the white and rufous increase in extent on the lateral feathers until the outermost are banded broadly with black edged with brown and narrowly with white blotched with rufous; lower parts from lower breast to vent creamy-white boldly barred with black; under wing-coverts, axillaries and under tail-coverts the same but with narrower bars of black.

The adult female generally retains a rufous tinge on the breast, less commonly also on the throat and chin.

Colours of soft parts. Iris dark brown or hazel; eyelids plumbeous green; upper mandible horny-black, paler at the extreme base, lower mandible horny-green, the gape yellower; legs and feet wax-yellow to almost orange-yellow.

Measurements. Wing 169 to 209 mm.; tail 137 to 157 mm.; tarsus 20 to 21 mm.; culmen about 22 to 24 mm.

Young birds are barred on the head and neck with white or rufous-white, the black bases in many individuals being almost entirely concealed; the back and wing-coverts are broadly tipped with rufous, nearly white on the extreme tips; the quills are tipped with rufous; whole lower plumage pale buff broadly barred with black, sometimes interrupted on the abdomen;

tail as in the adult but more rufous and with more numerous bars.

Distribution. The whole of India and Ceylon except the extreme North-West and Sind; throughout Burma to the Malay Peninsula. Outside India it ranges to China and even to Japan in the East, whilst South it is found through the Malay Peninsula to Malacca, Java, Borneo and the Moluccas.

Nidification. It is an extraordinary fact that very little is known of the breeding of this extremely common Cuckoo. Rattray has shown that one type of egg laid is exactly the same as the blue egg laid by *Cuculus canorus telephonus*, a pale blue egg either faintly spotted with neutral-tint specks or quite unspotted. These eggs are laid in the nests of *Trochalopterum lineatum*, *Hodgsonius phœnicuroides*, *Larvivora brunnea* and *Saxicola torquata indica*, all of which lay blue or bluish eggs, with which the Cuckoo's eggs do not contrast conspicuously. Stewart obtained the only complete oviduct egg known from a female in Travancore; this egg is all blue, but of a greyer shade than those found by Rattray, though otherwise very similar. Brutal as it may seem, the only way to make sure of this bird's eggs is to shoot breeding females until some oviduct eggs are secured. Evidently there is little doubt it will be found to lay some type of egg which cannot be distinguished from that of the foster parent except by special care. Twenty-four eggs average 23·7 × 18·1 mm.: maxima **26·0** × 19·0 and 25·1 × **20·0** mm.; minima **22·8** × 17·9 and 23·0 × **17·0** mm.

A collector for Major R. E. Skinner saw one of these Cuckoos sitting on a nest of a Paradise Flycatcher and, waiting until it flew away, examined the nest and took a Cuckoo's blue egg and two eggs of the owner from it.

The remains of an oviduct egg obtained by La Touche is described as pinkish-white marked with rich red and carmine very much like some eggs of the *Dicruridæ*.

In the Himalayas the Indian Cuckoo breeds during June and the latter half of May but in the Plains of India it must breed much earlier, as it commences calling in early April, continuing till the end of July.

Habits. The call of this Cuckoo, well syllabified by the Bengali name *Bo-kota-ko*, is one of the most common sounds of an Indian Spring in the wetter, better-wooded areas of India. The call is very melodious and full, carrying to a great distance and, though reiterated with great persistence, never becomes a nuisance. This bird is found in the Himalayas commonly up to 7,000 feet and more rarely up to 9,000 feet; normally, however, it is a bird of lower elevations under 5,000 feet. In its general habits it does not differ from the Common Cuckoo. To what extent it is locally migratory is not known but over the greater part of its habitat it is resident. It is not found in the drier parts of India, such as the Punjab, Sind, Rajputana and the more arid parts of Central India.

Genus HIEROCOCCYX.

Hierococcyx Müller, Verh. Land- en Volk., p. 233 (1842).

Type, *Cuculus fugax* Horsf.

The genus *Hierococcyx* differs from *Cuculus* in having a shorter, more rounded wing, the primaries exceeding the secondaries in the closed wing by only one-fifth to one-third the total length of the wing; such as we should expect in a more or less sedentary genus as against a typically migratory one.

The sexes are alike.

Key to Species.

A. No distinct dark cheek-band from the eye.
  a. Abdomen transversely banded in adults.
    a'. Wing over 200 mm. ..... *H. sparveroides*, p. 146.
    b'. Wing under 200 mm. ..... *H. varius*, p. 148.
  b. Abdomen never banded ..... *H. fugax*, p. 150.
B. A distinct dark cheek-stripe ..... *H. nanus*, p. 152.

(1457) Hierococcyx sparveroides.

THE LARGE HAWK-CUCKOO.

Cuculus sparveroides Vigors, P. Z. S., 1832, p. 173 (Simla-Almora Districts).
Hierococcyx sparverioides. Blanf. & Oates, iii, p. 211.

Vernacular names. *Bara Bharao* (Nepal); *Nimbin-Piyal* (Lepcha).

Description. Upper parts and sides of the head and neck ashy-grey, varying a good deal in depth, passing into rich glossy brown on the back, upper parts and wings; primaries banded with white on the inner webs and sometimes very faintly so with rufous on the outer webs; tail tipped white and banded black and grey, the black bands edged with brown; lores whitish; chin black; a grey-white moustachial streak; throat and fore-neck white, or pale ashy streaked darker ashy; breast mottled rufous and ashy or rufous with ashy shaft-stripes; remainder of lower parts white, generally suffused here and there with rufous and barred throughout with blackish-brown; vent and under tail-coverts pure white in old birds.

Colours of soft parts. Iris yellow to orange; eyelids orange; bill dark brown, lower mandible, except at the tip, and gape greenish-horny, the gape still more yellow; legs orange- to horny-yellow; claws pale yellow.

Measurements. Wing 201 to 240 mm.; tail 197 to 228 mm.; tarsus 26 to 27 mm.; culmen 21 to 23 mm.

Young birds are brown above faintly barred with rufous; chin

black and the rest of the lower parts pale rufous-buff, each feather with a broad central streak of black; flanks and thigh-coverts barred with blackish. Iris brown.

Young in the second stage assume the grey head and then gradually pass into the fully adult plumage.

Distribution. The Himalayas from Kumaon, Kashmir, Garhwal to E. Assam. Thence it is found throughout Burma, the Malay States and islands to the Philippines. East it extends to Yunnan, Siam and the Indo-Chinese countries to Western China.

It also occurs, probably as a straggler only, in the United Provinces and has been recorded from Raipur in the Central Provinces. It is common in the Nilgiris South to Travancore (*Stewart*), the Palni Hills (*Howard Campbell*) and The Wynaad (once only).

Nidification. The Large Hawk-Cuckoo breeds between 3,000 and 9,000 feet, laying its eggs in the Himalayas between June 15th and the end of July. In Assam it lays from the end of May to the middle of June or later, whilst in Burma eggs may be found from early April to June. Rattray took eggs in the nests of *Trochalopterum lineatum* and *Myiophoneus temminckii*, A. E. Osmaston in the nests of *T. erythrocephalum*, Mackenzie, Cook, Hopwood and others in the nests of *Garrulax moniliger*, *G. pectoralis* and several other species of *Garrulax*, *Trochalopterum*, *Ianthocincla*, etc. All these eggs are a pale bright blue, long, pointed ovals in shape with a hard glossy texture, whilst the surface in many is curious in possessing little longitudinal corrugation and, less often, little knots. In same eggs, however, there are none of either. These eggs agree well with those of the fosterers, all of which are blue with, or without, sparse markings. In Assam another type of egg is deposited in the nests of the Large Spider-Hunter, a bird which lays brown eggs varying from pale brown to dark olive-brown or vandyke-brown. The Cuckoos' eggs, whilst agreeing with those already described in shape, texture, etc., are in colour a brown, very similar to the Spider-Hunters'. In this Cuckoo we have the only example I know of two types of eggs evolved, not only differing in colour to suit their fosterers but also differing in size, as the blue eggs average about 30·1 × 21·9 mm. and the brown eggs about 26·0 × 18·9 mm.

Habits. This Hawk-Cuckoo takes the place of its better known cousin, the Common Hawk-Cuckoo, in the higher hills, only differing in its habits in being more a forest bird, less noisy and considerably wilder and more shy. Stevens records it as common in the Rongbong Valley, Sikkim, 5,000 feet, throughout the Winter and it has been recorded from 9,000 feet.

(1458) Hierococcyx varius.

THE COMMON HAWK-CUCKOO.

Cuculus varius Vahl, Skriv. Nat. Selsk., iv, p. 61 (1797) (India).
Hierococcyx varius. Blanf. & Oates, iii, p. 213.

Vernacular names. *Kapak* or *Upak*, *Pupiya* (Hind.); *Chok-gallo* (Beng.); *Bim-pi-yul* (Lepcha); *Kutti-pitta* (Tel.): *Zakhat* (Deccan); *Irolan* (Mal.); "Brain-fever" Bird of Anglo-Indians.

Description. Upper plumage ashy-grey, the wing-coverts with faintly paler edges and the upper tail-coverts more broadly edged with white and with less white barring on the outer feathers; primaries and outer secondaries ashy-brown, narrowly tipped paler and barred with white on the inner webs; tail with alternate bars white, changing to grey and then to black, the extreme

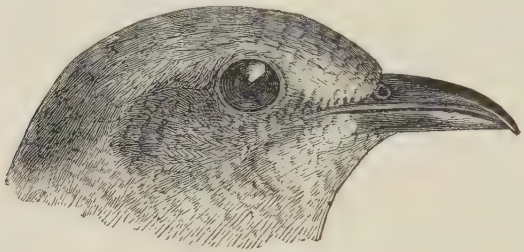

Fig. 22.—Head of *H. varius*. ½.

tip white or rufous-white; lores and moustachial streak whitish; cheeks, ear-coverts and chin mixed grey and white; throat more white; fore-neck, sides of the neck behind the ear-coverts and the breast mixed pale rufous and pale ashy, the former predominating; abdomen and anterior flanks white barred with brownish and a little rufous; posterior flanks, vent and under tail-coverts pure white.

Colours of soft parts. Iris yellow to orange; eyelid and bare skin yellow; bill yellowish-horny to greenish-horny, the tip and culmen blackish; legs and feet wax-yellow to almost horny-orange.

Measurements. Wing 177 to 193 mm.; tail 154 to 175 mm.; tarsus about 25 mm.; culmen 20 to 21 mm.

Young birds are brown above, barred everywhere with dull rufous; tail like that of the adult but the white replaced by rufous; lower parts white, more or less tinged with buff and marked on all but the vent and under tail-coverts with bold drops of blackish-brown.

At a later stage the sides of the neck become rufous whilst even in adult birds traces of a rufous collar on the hind-neck persist.

The iris in young birds is brown and the feet dull yellow.

Distribution. The whole of India except Sind and the Punjab. East it extends to extreme Eastern Bengal and to the Western districts, Kamrup and Goalpara, in Assam, where I have myself seen it. It is common in Ceylon.

Nidification. The Common Hawk-Cuckoo breeds throughout its area in May and June but in South-West India and Northern Central India a good many birds breed in late April, whilst in Bihar and Bengal eggs have been taken in the middle of March. In the foothills of the Himalayas it breeds in May and June, straggling up as high as 3,000 feet but not normally breeding at this elevation. It deposits its eggs almost exclusively in the nests of various species of *Argya* and *Turdoides* and it is only when it wanders into the hills off its normal habitat that it uses the nests of *Garrulax moniliger* and *G. pectoralis*. The egg in appearance exactly matches the eggs of *Turdoides* but it is bigger than any egg of *Argya* and smaller than those of *Garrulax*. Occasionally eggs may of course be found in other nests such as Bulbuls' etc. and Stewart took eggs from the nests of the Fairy Blue-bird. Although so extraordinarily like the eggs of *Turdoides* that they are constantly overlooked, they can really be easily distinguished by their great weight, very hard, thick shell and by their pale yellow yolk. The surface also is finer, smoother, yet less glossy, as a rule, than those of the fosterer and they stain easily in a manner the latter eggs never do. Often two or more Cuckoos' eggs are deposited in the same nest and in some five or six have been found, obviously the production of two or three Cuckoos. The eggs in shape are round or ellipses and in this respect, also, show a little difference from those of the fosterers, which are more oval. They measure about 26·0 × 20·0 mm. but vary very greatly in size. They average larger than the eggs of *Clamator jacobinus* but otherwise cannot be distinguished from them; fortunately the Crested Cuckoo usually lays later in the year, except in the Sikkim Hills, where it breeds much earlier.

The young Cuckoo when hatched ejects the other eggs and young from the nest and when more than one young Cuckoo is hatched the strongest survives.

Habits. The Indian Brain-fever Bird is unpleasantly common over the greater part of its range, wherever the country is well-wooded yet not actual forest. Its call is a very shrill and loud "pi-pee-ah," uttered rapidly with the emphasis on the second note, in rising crescendo until it can reach no higher, when, with a chuckle, it starts all over again. It calls continuously during the breeding-season, even during moonlight nights, and no garden is free of its presence. Its food consists principally of caterpillars and soft insects but this, and of all other Hawk-Cuckoos, is partly frugivorous, the birds eating all kinds of Fici, Guavas and soft fruit. Its flight is more hurried and swifter than that of the Common Cuckoo and it has a habit of hurling itself at a great pace

into whatever tree or bush it desires to perch in, generally selecting one with dense foliage for this purpose.

It is a resident bird wherever found, though because of its silence in the non-breeding season it is often supposed to be absent at that time.

Hierococcyx fugax.

Key to Subspecies.

A. Subterminal black band on tail followed by *broad* band of rufous-grey ..... *H. f. fugax*, p. 150.
B. Subterminal black band followed by *narrow* bands of rufous-grey and black ..... *H. f. nisicolor*, p. 151.

(1459) Hierococcyx fugax fugax.

THE JAVAN HAWK-CUCKOO.

Cuculus fugax Horsf., Trans. Linn. Soc., xiii, p. 178 (1821) (Java).

Vernacular names. None recorded.

Description. Whole upper plumage slate-grey; tail banded with black and grey, the subterminal black band the broadest and tipped with rufous; primaries darker and browner, both these and the outer secondaries barred with white on their inner webs: lores pale grey; sides of head and the chin dark grey; throat and fore-neck white lightly streaked with ashy-grey; remaining underparts white, more or less suffused with rufous, some birds having the under surface practically all rufous, whilst others have only the breast and flanks marked with this colour; the vent and under tail-coverts are always white.

Colours of soft parts. Iris orange-red; eyelids yellow; bill horny-black, the base and nearly all the lower mandible pale greenish-horny, the gape more yellow; legs, feet and claws bright yellow.

Measurements. Wing 166 to 174 mm.; tail 143 to 151 mm.; tarsus about 23 to 24 mm.; culmen about 21 mm.

Young birds are brown above, the feathers edged and barred with rufous; tail like the adult; lower plumage white, more or less rufous about the breast and profusely marked with bold bars and streaks of blackish.

Nestlings have the feathers of the head and upper back more definitely edged with pale rufous and have the chin, throat and upper breast dark brown narrowly edged with rufous.

Distribution. The Southern portion of the Malay States. In the Central and Northern parts of the Malay State both this and the next form are to be found and there is one typical specimen from the South of Tenasserim.

Nidification. Not known with any certainty. Blue eggs very similar to those of *H. sparveroides* but smaller have been sent me as being those of this Cuckoo; they were all taken in the nests of *Larvivora cyanea*.

Habits. As far as is known, those of the genus but perhaps more of a forest bird than one of the open country. The only recorded instance of its occurrence within our limits is that of a bird shot in Tenasserim, probably close to Amherst, and sent to me for identification; it was killed on or about the 27th January, 1908.

(1460) Hierococcyx fugax nisicolor.

HODGSON'S HAWK-CUCKOO.

Cuculus nisicolor Blyth, J. A. S. B., xii, p. 943 (1843) (Nepal).
Hierococcyx nisicolor. Blanf. & Oates, iii, p. 214.

Vernacular names. *Ding-pit* (Lepcha).

Description. This form differs from the last only in having a smaller bill and in the banding of the tail. In *H. f. nisicolor* the penultimate broad black band is followed by a *narrow* band of rufous-grey or grey-brown and then by another *narrow* band of black.

Colours of soft parts. Iris orange to vermilion. Other colours as in the preceding form.

Measurements. Wing 178 to 182 mm.; tail 141 to 144 mm.; tarsus about 23 to 24 mm.; culmen 19 to 20 mm.

Young birds differ from those of the Javan Hawk-Cuckoo in the same respect as do the adults.

Nestling, The only one I have been able to examine has the tail as in the adult *H. f. fugax*.

Distribution. Nepal, Sikkim to the extreme East and South of Assam; the extreme Eastern districts of Bengal; all Burma and the Malay States to Malacca. There is also one quite typical specimen from Singapore.

It is very doubtful whether *fugax* and *nisicolor* should be treated as races or as species. Over a very wide range both forms are found but with one exception these are specimens obtained in Winter, when Cuckoos, even the non-migratory species, wander greatly. It is possible that breeding specimens would prove that they have quite definite breeding areas, especially as typical *fugax* has never been seen North of Malacca except in the one instance referred to.

Nidification. The only oviduct egg known is one taken by Mandelli on the 5th June in Sikkim. Many eggs agreeing well with this have been taken by myself in North Cachar and the Khasia Hills and others again by Coltart in Margherita. They commence breeding in the end of May but I have heard males

calling late in August and have actually taken an egg as late as the 14th September. It breeds in the Assam Hills at all heights between 2,000 and 6,000 feet and probably a good deal higher. It is difficult to say what is the normal fosterer for this Cuckoo but the majority of eggs have been taken from the nests of Flycatchers of the genera *Cyornis*, *Niltava*, etc., and a good many from those of *Heteroxenicus nepalensis*. The Cuckoos' eggs vary from pale grey-green to yellowish-stone or pale brown in ground-colour but all are profusely speckled all over with darker reddish-brown, the spots often larger and forming a ring at the larger end. In shape the eggs are long ellipses, the larger end not differing much from the smaller. The texture is close and fine with a very slight gloss but the shells are very thin and fragile for those of a Cuckoo.

Habits. This little Hawk-Cuckoo seems to be almost entirely a forest bird and, moreover, to principally haunt damp ravines in very dense humid evergreen forest. It also haunts Pine-forests but in these keeps much to ravines and broken rocky ground where there is ample undergrowth. Its call is a thin, shrill repetition of that of the Larger Hawk-Cuckoos and it is almost equally persistent in calling. It keeps much to low tree or bush growth in the breeding-season but ascends the higher trees for calling purposes. It feeds, as far as I have been able to ascertain, very largely on small cicadæ, but it will devour any insect, hard or soft, and also eats a certain amount of fruit. I found it in the Khasia Hills feeding on blackberries and wild raspberries.

(1461) Hierococcyx nanus.

THE SMALL HAWK-CUCKOO.

Hierococcyx nanus Hume, Str. Feath., v, p. 490 (1877) (S. Tenasserim); Blanf. & Oates, iii, p. 215.

Vernacular names. None recorded.

Description. Lores dark ashy next the eye, produced as a broad streak downwards and backwards in front of the ear-coverts; lores next the bill whitish; crown and nape slaty-black, paler and browner in younger birds; in a few cases obsolete signs of a rufous or whitish supercilium are present; hind-neck and sides of neck mixed rufous and slaty, forming a well-defined collar; remainder of upper parts brown, barred more or less throughout with rufous; primaries notched on the outer webs with rufous and barred on the inner webs with whitish, the terminal inch being immaculate except for a fine white tip; tail broadly barred with dull grey and brown, tipped rather paler grey; anterior ear-coverts white, the posterior generally slaty-ashy; lower parts rufescent white, streaked everywhere except on the chin and lower tail-coverts with broad streaks of black.

Colours of soft parts. Iris brown; eyelids orange-yellow; upper mandible and tip of lower dull black, lower mandible and base of upper greenish-yellow; legs, feet and claws orange-yellow (*Davison*).

Measurements. Wing 142 to 153 mm.; tail 140 to 145 mm.; tarsus about 20 to 21 mm.; culmen 20 to 21 mm.

Younger birds have the crown concolorous with the back.

Nestling unknown.

Distribution. Tenasserim, Salangor, Mergui Islands, Borneo and Maprit in Siam, where it was obtained by Herbert.

Nidification. Unknown.

Habits. Very little on record; apparently restricted to heavy evergreen forest country.

Genus CACOMANTIS.

Cacomantis Müller, Verh. Nat. Gesch. Land- en Volk., p. 177 (1842).

Type, *Cuculus passerinus* Vahl.

The genus *Cacomantis* is a genus of small-sized Cuckoos distinguished from *Cuculus* by its shorter, more rounded wings, the primaries exceeding the secondaries by only about one-third the length of the wing; the tail is as long as, or longer than, the wing and well graduated.

Sexes alike.

It contains four species divided into many well-marked geographical races which extend from India to the Fiji Islands and Australia. One species is found in India.

Cacomantis merulinus.

Cuculus merulinus Scop., Del. Flor. et Faun. Insubr., ii, p. 89.

Type-locality: Island of Panay, Philippines.

Differs from our Indian races in being smaller and paler below.

Key to Subspecies.

A. Upper parts dark ashy.
  a. Abdomen white or grey ..... *C. m. passerinus*, ad., p. 154.
  b. Abdomen rufous..... *C. m. querulus*, ad., p. 156.
B. Upper parts brown and rufous.
  c. Crown and rump chiefly rufous, not regularly barred ..... *C. m. passerinus*, juv., [p. 154.
  d. Upper parts barred throughout .... *C. m. querulus*, juv., p. 156.

(1462) Cacomantis merulinus passerinus.

THE INDIAN PLAINTIVE CUCKOO.

Cuculus passerinus Vahl, Skriv. Nat. Selsk., iv, p. 57 (1797) (India; now restricted to Malabar).
Cacomantis passerinus. Blanf. & Oates, iii, p. 216.

Vernacular names. *Pousya* (Mahr.); *Chinna-katte-pitta* (Tel).; *Koha* (Cing.).

Description. Upper plumage from forehead to upper tail-coverts, sides of head and neck dark ashy-grey; scapulars and wing-feathers browner with a slight bronze gloss; shoulder of wing white and an oblique band of white on the inner webs of the primaries; tail black or slaty-black, tipped with white, the outermost pair of feathers barred with white on the inner webs and the next two pairs with traces of these bars; throat and chin grey, nearly as dark as the sides of the head, becoming paler towards the vent and under tail-coverts, which are nearly always white.

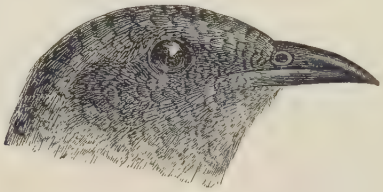

Fig. 23.—Head of *C. m. passerinus.* ½.

Colours of soft parts. Iris brown-red to crimson; bill dark horny-brown, the base of the lower mandible greenish or yellowish and the gape and mouth salmon-colour; legs and feet yellow, dingy yellow to yellowish-brown, claws darker and soles paler.

Measurements. Wing 114 to 122 mm.; tail 99 to 119 mm.; tarsus about 18 to 19 mm.; culmen 16 to 17 mm.

Young birds are bright chestnut above, barred with black on the back, scapulars, wing-coverts and inner secondaries, the tail is marked longitudinally with black along the shaft; chin, throat and breast white suffused with chestnut or, rarely, all of this colour with a few bars of black; remainder of lower plumage white with narrow wavy bars of dark brown. In quite fresh plumage there are small white tips to the tail-feathers which soon wear off. Iris brown.

In older plumage the bars and black patches on the upper parts tend to disappear.

Nestlings have the upper parts dark brown, each feather broadly edged with rufous; the tail black, barred and mottled.

with rufous and white; under plumage white, more or less suffused with chestnut on chin, throat and breast and banded throughout with dark brown. Some young birds moult direct from this stage into the adult plumage.

Distribution. Found practically throughout the better-wooded, more humid plains and hills of India up to 8,000 feet or higher. It occurs in the Himalayas as far as Western Nepal and Sikkim and is common in Western Bengal and Orissa. It is also common in Ceylon. In the driest parts of the Punjab, North-West Provinces, Sind and Rajputana it is absent or rare but round about Hyderabad in the Deccan it is extremely abundant.

Nidification. In the Nilgiris this little Cuckoo lays in August, September and October, placing its eggs in the nests of *Prinia inornata jerdoni* and laying eggs very similar to those of that bird but larger, paler and more feebly marked. In Lucknow Adam was brought these eggs with those of the same foster parent in September. In Kanara Bell and Davidson took numerous eggs in the nests of *Cisticola* and *Orthotomus* in July and August. These eggs had a white or pale blue ground with light reddish blotches and agreed well with the white or blue eggs of the Warblers. Eggs resembling these have been sent to me from Dehra Dun, the United Provinces and Poona, but from Hyderabad I have received wonderful series of eggs from Professor Barnett, Col. Sparrow and others which are most extraordinary examples of adaptive selection. In this quite small area the Cuckoo has deserted its ordinary foster parents and is parasitic almost entirely on *Prinia socialis*, a Warbler which lays very bright chestnut-red eggs and we find that a bright pink-red egg has been evolved to go with that of this Warbler.

In shape all the eggs are alike—long, narrow ovals with one end appreciably smaller than the other; the texture is fine, the surface slightly glossed and the shell stouter and heavier than passerine eggs of the same size. They measure about 19·9 × 14·0 mm.

Habits. The Indian Plaintive Cuckoo is found in gardens, scrub, light forests and in orchards, groves, etc., round villages and towns. It is resident wherever found, though it may move locally in the breeding-season, as at Mount Aboo. In Ceylon also Wait considers it to be migratory, only visiting Ceylon during the North-East Monsoon, whilst in the Himalayas, above 2,000 feet, Stevens and others say it is only a breeding visitor. Stevens syllabifies its notes as "pe-peak," followed by "tay-ta-tay" in an ascending scale, a very mournful little cry, especially when uttered, as it so often is, to the accompaniment of leaden skies and the swish of fast-falling rain. It is a very restless Cuckoo and seems to be ever on the move, flitting from one branch to another or flying with rapid Hawk-like flight from tree to tree. Its food is, as far as is known, entirely insectivorous.

(1463) Cacomantis merulinus querulus.

THE BURMESE PLAINTIVE CUCKOO.

Cacomantis querulus Heine, Journ. für Orn., 1863, p. 352 (Nepal).
Cacomantis merulinus. Blanf. & Oates, iii, p. 218.

Vernacular names. *Chota bhrou* (Beng.).

Description. Above, this race differs from the preceding form only in being a paler grey, but the difference below is striking, the whole lower plumage from the breast being ferruginous, this colour often also suffusing the breast and fore-neck, which is grey of a paler shade than in *C. m. passerinus.*

Colours of soft parts as in the other races.

Measurements. Wing 109 to 119 mm.; tail 112 to 125 mm.; tarsus 17 to 18 mm.; culmen 15 to 17 mm.

Young birds are barred brown and dull chestnut on the whole of the upper plumage, wings and tail, with the exception of the primaries, which are all brown; chin, throat and fore-neck are chestnut streaked with blackish, remainder of lower parts white, more or less suffused with rufous and narrowly barred with dark brown.

Nestlings are brown above, the feathers fringed with dull chestnut.

Distribution. Eastern Bengal and Assam, the Lower Himalayas from Nepal and Sikkim, the whole of Burma to the Northern Malay States, where it is replaced by another very similar form, *threnodes*; East it extends through Yunnan, Shan States, Annam, Cochin China to South China and Hainan.

Nidification. Fielden obtained the eggs of this Cuckoo in Thayetmyo in the nests of the Tailor-bird and Surgeon-Captain Jones took a fine series in nests of the same bird round about Hongkong from April to July. In the Khasia Hills the Burmese Plaintive Cuckoo breeds in great numbers from April to July from the foothills up to 6,000 feet. Its favourite foster parent is the little Fantail Warbler, the next most popular the Brown Hill-Warbler, whilst after this come birds of the genera *Orthotomus* and *Franklinia.* The eggs vary in ground-colour from pure white, which is most usual, to a fairly deep blue, just as do the eggs of all the fosterers; like them also they are speckled or blotched with reddish-brown, pale brown or dark brown. Many eggs are exactly like those of the foster parent, except in size and when deposited with the larger eggs of the *Suya* they must very often escape human detection unless the finder is carefully on the look out for them, and notes the coarser and heavier shell with the paler yolk. Most eggs have a fair gloss and the surface is very smooth. They measure about 19·8 × 13·8 mm. It is most exceptional to find more than one Cuckoo's egg in a nest.

Habits. Similar to those of the preceding bird.

Genus **PENTHOCERYX**.

Penthoceryx Cabanis, Mus. Hein., iv, p. 16 (1862).

Type, *Cuculus sonneratii* Lath.

The genus *Penthoceryx* resembles *Cacomantis* in structure and size but differs from it in having the tail-feathers a little narrower towards their tips; wing as in *Cacomantis*. The genus differs from all the preceding genera in having no change of plumage from the young to the adult.

Penthoceryx sonneratii.

Key to Subspecies.

A. Upper plumage brighter and more rufous.
  a. Larger; wing 116 to 133 mm. ..... *P. s. sonneratii*, p. 157.
  b. Smaller; wing 98 to 114 mm. ..... *P. s. venustus*, p. 159.
B. Upper plumage darker and more brown.. *P. s. waiti*, p. 159.

(1464) Penthoceryx sonneratii sonneratii.

THE INDIAN BANDED BAY CUCKOO.

Cuculus sonneratii Lath., Ind. Orn., p. 215 (1790) (India: restricted to North Cachar Hills).
Penthoceryx sonnerati. Blanf. & Oates, iii, p. 219 (part).

Vernacular names. *Basha katti pitta* (Tel.).

Fig. 24.—Head of *P. s. sonneratii*.

Description. A few white specks and bars on the forehead and anterior crown; remainder of upper plumage barred brown and rufous; tail tipped white and subtipped black, the middle tail-feathers rufous, the centres black running on to either web in incomplete bars, the rufous increasing outwardly until on the outermost feathers the black shows merely in narrow bars; tips of primaries unbarred brown; lores and ear-coverts mixed white, brown and rufous; sides of head and neck, lower plumage, axillaries and under wing-coverts white or buffy-white with very fine wavy bars of brown.

Colours of soft parts. Iris brown or slaty-brown with a bright red outer circle; bill greenish-yellow or horny-green, the culmen and tip dark brown to black; gape more yellow; legs and feet dull greenish-slate or greenish-brown.

Measurements. Total length about 240 mm.; wing 116 to 133 mm.; tarsus 17 to 18 mm.; culmen 19 to 21 mm. Wing generally under 125 mm.

Young birds merely differ in having the rufous bars more prominent, the brown bar on the upper parts and the rufous on the tail more in extent.

Distribution. India, Burma and Siam as far South as Central Tenasserim. Common in India on the Malabar coast and Southern Bombay Presidency and extremely common in the hills of South Assam. Elsewhere it is scattered, but rare, throughout the wetter, more wooded parts both of the plains and the lower hills of the Himalayas from Mussoorie to Assam.

Nidification. An oviduct egg from a bird shot by Mr. J. A. Kemp is broad oval in shape, ground-colour dull lilac with rufous-pink spots profusely scattered all over it. Eggs in Western India very similar to this, but browner, have been taken by Bell, Davidson and others from the nests of *Iora*, *Otocompsa* and *Dumetia*. Other eggs have been taken by myself, Coltart, Primrose and Hole from the nests of Bulbuls (various), *Tribura*, *Stachyris*, *Stachyridopsis*, *Malacocincla*, *Urocichla*, etc. In one or two cases these eggs exactly resemble the oviduct egg but they range from this, a dark egg, to others with a pale cream or pink ground with a few specks or blotches of reddish-brown. In the Khasia Hills I have taken many Cuckoos' eggs from the nests of *Alcippe* which I believe to be of this Cuckoo. These eggs vary from pure white speckled with purple-brown to a deep dull pink or lilac, minutely freckled everywhere with dull neutral tint or reddish-brown, the spots generally larger and more definite at the larger end, where they may form an obscure cap or ring. Many of these eggs are very like those of *Alcippe*, which also vary extremely in coloration but they have a different, coarser texture with less gloss; they weigh heavier in proportion and average considerably larger. In a few instances in which the types of both fosterer and Cuckoo agree they are difficult to distinguish. They average about 19·3 × 15·8 mm.

In the Bombay Presidency their breeding-season is very long. Davidson and Bell took eggs in February and March, Kemp obtained his oviduct egg in June and Davidson again took eggs in August. In the hills of Assam they breed principally in May and June but I have taken eggs from the end of April to early August.

Habits. This Cuckoo is a frequenter of forest or of heavily-wooded open and cultivated country, being rare in dry areas and absent in the driest. It is common in the West coast of India to Kanara and again in Eastern Assam and the hills

South of the Brahmaputra. In its habits it closely resembles the various races of *Cacomantis* but its food over the greater portion of the year seems to be almost exclusively caterpillars and termites. It ascends the hills of Southern India and the Himalayas up to 7,000 or 8,000 feet. Its call is a curious high-pitched one, not unlike the "Bo-kota-ko" of the Indian Cuckoo, but much higher, whilst another is not unlike that of the Plaintive Cuckoo but different in cadence.

(1465) Penthoceryx sonneratii venustus.

THE MALAY BANDED BAY CUCKOO.

Cuculus venustus Jerdon, Madr. Journ. L.S., xiii, p. 140 (1842) (Malacca).
Penthoceryx sonnerati. Blanf. & Oates, iii, p. 219 (part).

Vernacular names. None recorded.

Description. Exactly like the Indian form but smaller.

Colours of soft parts as in the other races.

Measurements. Wing 98 to 114 mm.; culmen 17 to 19 mm.

Distribution. Central Tenasserim and South-West Siam to the Malay Peninsula, Borneo and Sumatra.

Nidification. Unknown.

Habits. Similar to those of the other races of *Penthoceryx*.

(1466) Penthoceryx sonneratii waiti.

THE CEYLON BANDED BAY CUCKOO.

Penthoceryx sonneratii waiti Stuart Baker, Bull. B.O.C., xxxix, p. 47 (1918) (Ceylon).
Penthoceryx sonnerati. Blanf. & Oates, iii, p. 219 (part).

Vernacular names. *Punchi koha* (Cing.); *Kayil*, *Kusil* (Tam.).

Description. Similar to the Indian race but very much darker above and more brown, less rufous; the tail-feathers have more black, the rufous on the central pair being reduced to notches on the outer edges.

Colours of soft parts. Iris brown or slate with an outer ring of bright red; bill blackish, the base and lower mandible bluish or greenish-horny; legs and feet brownish-slate, the toes yellower.

Measurements. Wing 121 to 126 mm.; culmen 19 to 20 mm.

Distribution. Ceylon only. Birds from the extreme South of Travancore are like the typical Indian bird.

Nidification. Not known.

Habits. Similar to those of the other races. Wait says that it "frequents the edges of tanks where there are dead trees"; also "chenas" and the park country. It is a shy bird, keeping to the tops

of trees. It is noisy in the mornings and evenings, giving out a curious whistle, which Legge represents as "whi-whip, whi-whip—whi-whip—whi-whip." It also has a call-note, beginning in a low key, changing to a higher and then dying away.

Genus CHALCITES.

Chalcites Lesson, Traité d'Orn., p. 152 (1831).

Type, *Cuculus chalcites* Illiger = *Cuculus basalis* Horsf.

Chrysococcyx Boie, 1826, cannot be used for our Indian birds, as the type *C. cupreus* Shaw is not congeneric with them. Stresemann (Nov. Zool., xxxii, p. 158, 1925) has shown that *Chalcites* must be adopted.

This genus includes two Indian species as well as others which extend from outside India, through the Malay Peninsula and Indo-Chinese countries to New Guinea. They are small Cuckoos of brilliant plumage, the sexes different in colour and the nestlings different to either. The tail is short and well-graduated; the wings are long and pointed, the primaries exceeding the secondaries by nearly half the length of the wing; the tarsus is feathered throughout.

Key to Species.

A. Upper parts glossy violet	*C. xanthorhynchus*, ♂ ad., p. 160.
B. Upper parts brilliant green ..	*C. maculatus*, ♂ ad., p. 162.
C. Upper parts light coppery-green	*C. xanthorhynchus*, ♀ ad., p. 161.
D. Upper parts green, crown rufous	*C. maculatus*, ♀ ad., p. 162.
E. Nestlings barred rufous and brown above, white and brown below	*C. xanthorhynchus*, juv., p. 161. *C. maculatus*, juv., p. 162.

(1467) Chalcites xanthorhynchus.

The Violet Cuckoo.

Cuculus xanthorhynchus Horsf., Trans. Linn. Soc., xiii, p. 179 (1822) (Java).

Chrysococcyx xanthorhynchus. Blanf. & Oates, iii, p. 221.

Vernacular names. *Daopiu-pip* (Cachari).

Description.—Male. Whole head and neck, upper breast, upper plumage and exposed parts of wings and tail deep, glossy violet-purple; inner webs of wing-quills black; the outermost pair of tail-feathers with partial white bars on either web not meeting at the shaft; remaining lower parts white banded with violet or green with a metallic gloss.

Colours of soft parts. Iris red; eyelids green with a red rim; bill orange-yellow or bright yellow; legs and feet brownish-green, the claws more yellow.

Measurements. Wing 95 to 105 mm.; tail 64 to 72 mm.; tarsus 14 to 15 mm.; culmen 16 to 17 mm.

Female. Above pale bronze-green, here and there tinged with copper, a little darker on the crown; sometimes a little white on the forehead (? immaturity); wing-quills on the inner webs with a broad oblique chestnut patch on two-thirds their length; all but the centre tail-feathers chestnut, tipped white, subtipped black with black and white central patches; lower plumage, sides of head and neck white barred with pale brown glossed with bronze; the bars narrowest on the chin and throat and broadest on the vent.

Colours of soft parts. Bill dull yellow, culmen and base dusky.

The young bird is barred above with rufous and brown and below is white with brown bars.

The nestling is similar to the young bird but has the whole head and neck above and below streaked instead of barred with black.

Young males moult direct from the barred rufous stage into that of the adult and are never like the female.

Distribution. Assam, Bengal East of the Bay, Burma, Siam, Malay Peninsula, Nicobars and Andamans, Sumatra, Java, Borneo, Palawan and Philippines.

The only specimen in the British Museum collection from the Philippines is a deep *purple*-blue, unlike any others from elsewhere.

Nidification. Nearly all the eggs I have taken of this bird have been from the nests of the Little Spider-Hunter, with which they match very well, though the ring of markings at the larger end are generally brown or reddish-brown rather than brick-red. The ground-colour varies from pure white to pink. I have also taken eggs from the nests of Sunbirds, the Thick-billed Flowerpecker (*Piprisoma*) and *Cisticola* but the last is probably an abnormal foster parent. The eggs measure from 17·9 × 13·2 to 16·2 × 11·8 mm. and the average of seven eggs is 17·2 × 12·5 mm.

The eggs of this Cuckoo cannot be distinguished, as far as we know at present, from those of the next and the only way to identify them is to watch which Cuckoo haunts the vicinity of the nest. Primrose, Inglis, Hole and myself found that the breeding female keeps to a very circumscribed area, generally a single ravine and the adjacent forest, so that it should be possible to make fairly certain of the parentage now that the eggs are known.

Habits. Very much the same as those of the Emerald Cuckoo but the Violet Cuckoo seems less restricted to the broken land and foot-hills than that bird is. Both birds wander up to about 5,000 feet but at this height the Violet Cuckoo is more common than the Emerald, whilst the reverse is the case in the Plains of Assam and the adjoining hills up to 2,000 feet.

(1468) Chalcites maculatus maculatus.

THE EMERALD CUCKOO.

Trogon maculatus Gmelin, Syst. Nat., i, p. 404 (1788) (Ceylon, in errore; Pegu, *Rob. & Kloss*).
Chrysococcyx maculatus. Blanf. & Oates, iii, p. 222.

Vernacular names. *Ang-pha* (Lepcha); *Dao-piu-pip* (Cachari).

Description.—Adult male. Whole head, neck, upper plumage and upper breast brilliant glossy green with golden-bronze reflections here and there; concealed portions of wing-quills blackish and the tips more blue; inner webs of primaries with a longitudinal patch of white on the centre, the secondaries with the bases all white on the inner webs; outer tail-feathers tipped white, the outermost pair with three irregular white bars; lower breast, flanks and abdomen white with metallic bronze-green bars; lower tail-coverts rich metallic green barred with white on the basal halves.

Colours of soft parts. Iris reddish-brown to crimson; eyelids crimson; bill bright orange-yellow, tipped with black; legs and feet dark brownish-green.

Measurements. Wing 105 to 114 mm.; tail 63 to 70 mm.; tarsus about 15 mm.; culmen 14 to 15 mm.

Female. Crown and nape rufous; back and wings light copper-green, much mixed with copper; tail generally darker, with a still darker tip, the outermost pair with three white and black bars and the two next with patches of black and broad black subterminal bands; lower parts white, tinged with rufous on the chin, throat and upper breast and barred throughout with bronze-brown bars, narrowest on the throat, broader and further apart on the vent, abdomen and under tail-coverts.

The iris is brown, and the bill yellow only on the base.

Young birds, taken from the nest by myself, were barred rufous and brown above, the marks on the head being elongate instead of across; the chin, throat and fore-neck were dull rufous similarly marked with black and the rest of the lower plumage dull white and brown in alternate bars.

Distribution. The Himalayas from Kuman to Assam; all Burma, the Indo-Chinese countries to Hainan; Yunnan and Western China, common in Setchuan to the Yangtse.

The Malayan bird is much smaller with a wing measuring only 91 to 100 mm. and nearly all under 95 mm.

Nidification. Mr. A. M. Primrose discovered this bird breeding freely in the Goalpara district of Assam, depositing its eggs in the nests of the Sunbird *Æthopyga s. seheriæ*. The nests of these latter were all built under the overhanging banks of ravines in dense forest. The most common form of egg is yellowish-white in ground-colour with tiny smudgy blotches of light brown,

most numerous at the larger end, numerous to sparse elsewhere. These eggs, except that they are much larger, are very like a common type of egg laid by the Sunbirds. Other eggs of this Cuckoo deposited in the nests of the Small Spider-Hunter are similar but have the marks almost confined to a ring at the larger end. These also agree well with those of the foster parent but are brown in general tint of markings instead of brick-red as in *Arachnothera*. Other eggs have been taken from the nests of *Phylloscopus r. harterti* and various species of *Cisticola*. The texture of the eggs is rather coarse for so small an egg and they are exceptionally light and fragile for a Cuckoo's egg. In shape they are ovals with an obtuse smaller end. Seventeen eggs average 16·9 × 12·3 mm.: maxima **18·0** × 12·6 and 16·3 × **12·8** mm.; minima **15·2** × 12·0 and 16·1 × **11·9** mm.

Eggs are laid from the middle of April to the end of July.

Stevens found this little Cuckoo breeding at 4,500 feet, depositing its eggs in the nests of *Cryptolopha castaneiceps*. He has informed me that in no instance were the nests of this little Warbler injured in any way by the Cuckoo in depositing its eggs.

Habits. The Violet Cuckoo is essentially a bird of evergreen forests and of all the Cuckoos this and the next species are the hardest to find and most difficult to watch, as they keep almost entirely to the tops of very lofty trees among the dense leaves and branches. It is only during the breeding-season that the females come low down among the shrubs etc. in their search for nests. It is probably this secretiveness which gives them their reputation for rarity, as both in Cachar and the Khasia Hills we found them very common when once we could locate them by their call, a shrill but not unmusical succession of three notes in an ascending scale. Often when found by their notes they could not be seen and both Hole and I more than once obtained specimens by shooting at moving leaves, whence we thought the whistles came. They seem to feed much on small cicadæ, small green caterpillars and soft grubs but eat also practically any insects they come across as well as spiders of some size. In the non-breeding season two or three pairs may be seen feeding together where trees are infested with caterpillars and they also feed greedily on an aphis that attacks orange-trees. Their flight is very swift and powerful.

Genus **SURNICULUS.**

Surniculus Lesson, Traité d'Orn., p. 151 (1831).

Type, *Surniculus lugubris* Horsf.

I reviewed this genus at some length in 1919, in 'Novitates Zoologicæ' and then recognized three fairly well-defined races. I see no reason to alter the views I then expressed.

The genus is remarkable for its extraordinary resemblance, both in structure and coloration, to the common Black Drongo-Shrike. It differs from all other Cuckoos in the shape of the

tail, which is very long and forked, the central pair being shorter than all but the outermost pair, which fall short of the tip of the tail by about one-third its length.

The bill is like that of *Cacomantis*; the wing fairly long and pointed but the primaries do not exceed the secondaries by more than a quarter the length of the wing.

Surniculus lugubris.

Cuculus lugubris Horsf., Trans. Linn. Soc., xiii, p. 179 (1821).

Type-locality: Java.

The typical form differs from those found in Burma and India in being smaller and from that found in Ceylon in having a much shorter tail. Each race seems, also, to have a consistent wing formula.

Key to Subspecies.

A. Wing average 126·1 mm.; third primary much longer than fourth ..... *S. l. brachyurus*, p. 164.
B. Wing average 137·4 mm.; third primary as above ..... *S. l. dicruroides*, p. 165.
C. Wing average 126·5 mm.; fourth primary longest, or rarely equal to third ..... *S. l. stewarti*, p. 166.

(1469) Surniculus lugubris brachyurus.

THE MALAY DRONGO-CUCKOO.

Surniculus lugubris brachyurus Stresemann, Nov. Zool., xx, p. 340 (1913) (Pahang, Malay Peninsula).
Surniculus lugubris. Blanf. & Oates, iii, p. 223.

Vernacular names. None recorded.

Description. Black throughout with a gloss varying from deep steel-green to purple-blue. There is a white nape-spot in all but the oldest birds and the under tail-coverts and outermost tail-feathers are nearly always banded with white; the first primary has a white spot on the inner web and the third to the innermost primary have a white bar obliquely running across their bases; the edge of the wing is often mottled with white and many birds retain signs of juvenile plumage in white spots on the wing-coverts, upper tail-coverts, back or head.

Colours of soft parts. Iris brown or crimson; bill, legs and feet black.

Measurements. Wing 109 to 133 mm.; tail 103 to 133 mm.; tarsus about 19·0 mm.; culmen from nostril 15·0 to 16·5 mm.

Young birds have no gloss and the feathers of the head, back and breast have many terminal white spots; the wing-coverts are tipped with white and there is more white on the tail and under tail-coverts.

Nestlings are dull black speckled all over with white.

Distribution. Peninsular Burma and Siam, Malay States to the extreme South. In the Malayan islands other races take its place.

Nidification. There is practically nothing on record about the eggs of this Cuckoo. Kuschel, in a letter, says: "I have secured eggs of this species from the nests of *Henicurus leschenaulti*, *Pycnonotus aurigaster*, *Megalurus palustris* and *Lanius*." An egg sent me with the letter has a pale creamy ground with a few specks of rusty-red thinly scattered all over it. In shape it is a short ellipse and measures 19·5 × 14·9 mm. It was taken on the 5th of April.

Habits. The Drongo-Cuckoo is a bird of open country which is well-wooded and it is also said to haunt light forest. Its call is a most human whistle of six notes in an ascending scale and it also utters a very plaintive double note, sounding like "wee-whip" and very like a breeding call of the common Black Drongo. Its flight also is generally dipping and buoyant, much like the flight of that bird but it is capable of direct and speedy flight when necessary. Its food consists of caterpillars, soft insects, beetles and sometimes seeds, though, personally, I have never taken these from the stomachs of any examined by me.

(1470) Surniculus lugubris dicruroides.

THE INDIAN DRONGO-CUCKOO.

Pseudornis dicruroides Hodgs., J. A. S. B., viii, p. 136 (1839) (Nepal).
Surniculus lugubris. Blanf. & Oates, iii, p. 223 (part).

Vernacular names. *Kario-vyem* (Lepcha).

Description. Only differs from the preceding bird in being larger.

Colours of soft parts as in the other races.

Measurements. Wing 129 to 147 mm., average 137·4 mm.; tail 106 to 133 mm.; tarsus about 19·0 mm.; culmen from nostril to tip 15·5 to 17·0 mm.

Distribution. Upper India, Assam; Burma and Siam, North of the peninsular portion, say latitude 10°; Hainan and China.

Nidification. This Cuckoo certainly breeds in April, May and June in Northern India and Assam but very little is yet known about it. Rattray has seen King-Crows feeding a young one and took an egg from a King-Crow's nest which he thinks may be an egg of this Cuckoo. It is much like that of some Drongos, *i. e.* a cream ground-colour with blotches and marks of deep red, but it is different in colour to the three eggs of the fosterer and very different in texture. It measures about 22·5 × 17·5 mm., and if really a Cuckoo's, is proportionately much the largest Cuckoo's egg

I have ever seen. An egg taken by Coltart in Lakhimpur, in the nest of a Forktail, is very like that of Kuschel's but is larger, measuring 22·2 × 15·3 mm. and is marked with darker brown and grey-brown. Nehrkorn describes the egg of the species as exactly like those we know of *Cacomantis* and as being deposited in the nest of *Suya crinigera*. There may be some mistake in regard to the identification of this egg.

Habits. Those of the species.

(1471) Surniculus lugubris stewarti.

THE CEYLON DRONGO-CUCKOO.

Surniculus lugubris stewarti Stuart Baker, Nov. Zool., xxvi, p. 293 (1919) (Ceylon).
Surniculus lugubris. Blanf. & Oates, iii, p. 223 (part).

Vernacular names. *Koha* (Cing.); *Kuyil, Kusil* (Tam.).

Description. Similar to *S. l. brachyurus* and about the same size but with a smaller bill, longer tail and a different wing formula.

Colours of soft parts as in the other races.

Measurements. Wing 123 to 131 mm., average 126·5 mm.; tail 136 to 146 mm.; tarsus about 16 mm.; culmen from nostril to tip 13·5 to 14·1 mm.

Wing formula: fourth primary longest, rarely equal to third.

Distribution. Ceylon, Travancore, West coast of India and North to Karwar in the Bombay Presidency.

Nidification. Both Davidson and Bell have seen Drongos feeding young Drongo-Cuckoos and the latter has obtained eggs in the nests of *Dicrurus macrocercus* which he believes to be those of the Cuckoo. He describes the eggs as "the same size as those of *D. ater*, in whose nest they were found, and are similar; the shape is somewhat abnormal, tending to both ends being equally obtuse." This evidence certainly supports that of Rattray's in reference to the Himalayan form. On the other hand, Wait obtained a young *Surniculus* in the nest of the Black-fronted Babbler and has taken two eggs from the nests of these birds which we believe to be *Surniculus* eggs. They are grey-white eggs speckled and blotched with brown and with underlying marks of neutral tint. They measure 19·3 × 14·7 and 19·6 × 14·8 mm. Another egg taken by Stewart in Travancore, also from the nest of *Rhopocichla*, is exactly like these and measures 19·5 × 14·6 mm. Yet a fourth egg taken in an Iora's nest with two of that bird is of the same type, though less boldly marked. It measures only 17·5 × 13·8 mm. In Ceylon the breeding months seem to be from December to May, and in Travancore January to March.

Habits. Those of the species.

Genus CLAMATOR.

Clamator Kaup, Entwick. Gesch. der Europ. Thier., p. 53 (1829).

Type, *Cuculus glandarius* Linn.

Stejneger has shown (Proc. Biol. Soc. Washington, xv, p. 87) that *Clamator* is the correct name for this genus, antedating *Coccystes* by five years.

This genus is distinguished from all others of this Subfamily by having a long pointed crest; the tail is much longer than the wing and is well graduated; the wing is short and rounded, the primaries not exceeding the secondaries by more than one-fourth the length of the wing; the tarsns is feathered at the base only; the bill is compressed and the culmen much curved at the top.

The sexes are alike and the young very similar to the adult.

Key to Species.

A. Wings black and white..... *C. jacobinus*, p. 167.
B. Wings chestnut ..... *C. coromandus*, p. 170.

Clamator jacobinus.

Key to Subspecies.

A. Larger; wing over 142 mm. ..... *C. j. jacobinus*, p. 167.
B. Smaller; wing under 142 mm. ..... *C. j. taprobanus*, p. 169.

(1472) Clamator jacobinus jacobinus.

THE PIED CRESTED CUCKOO.

Cuculus jacobinus Bodd., Tabl. Pl. Enlum., p. 53 (1783) (Coromandel Coast).
Coccystes jacobinus. Blanf. & Oates, iii, p. 225 (part).

Vernacular names. *Pupiya*, *Chatak* (Hind.); *Kola Bulbul* (Beng.); *Gola Kokila*, *Tangada gorankah* (Tel.).

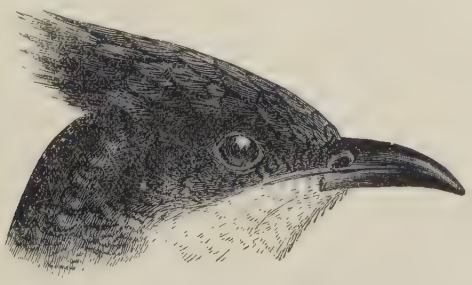

Fig. 25.—Head of *C. j. jacobinus.* ½.

Description. Upper plumage black glossed with steel-green; primaries with a broad band of white across both webs of all but

the first, which has it on the inner web only; tail-feathers tipped white, very narrowly on the centre, more broadly on the lateral; lower parts white, sometimes greyish-white, sometimes tinged with fulvous.

Colours of soft parts. Iris brown to red-brown; bill black; legs and feet dark; legs dark slate or leaden-blue.

Measurements. Wings, 52 specimens, 146 to 161 mm.; five specimens from various localities have wings measuring only 140 to 145 mm., one of these is from as far North as Calcutta; tail 157 to 159 mm.; tarsus 27 to 28 mm.; culmen 20 to 22 mm.

Young birds are brown instead of black, the tips of the tail fulvous instead of white; the wing-bar is smaller and often fulvous-white; chin and throat fulvous-grey; edges to wing-coverts fulvous-grey, not at all conspicuous.

Distribution. All India from the Lower Himalayas to Travancore West from Kashmir and Afghanistan to Assam; Burma South to the Northern Pegu Yomas and Karenni. It ranges throughout the greater part of South Africa South of the Sahara.

Nidification. This is one of the few Cuckoos of which it may be said that evolution of the egg is perfect or complete. Many oviduct eggs have been taken and these, like the eggs found with the fosterers, have all been of one type. The Pied Crested Cuckoo practically invariably deposits her eggs in the nests of Babblers of the genera *Turdoides* (*Crateropus* auct.) and *Argya*. Both these genera lay deep blue eggs which in shape are blunt broad ovals, often almost elliptical. The Cuckoo lays eggs that are always either elliptical or spheroidal in shape and in size and colour much the same as the eggs of *Turdoides terricolor*. Of course, when placed in the nests of the small *Argya* the difference in size is conspicuous, though not nearly so greatly so as it often is in the eggs of other Cuckoos. The texture is close and hard, the shell very thick and the surface exceedingly fine and smooth, though seldom glossy like the fosterers' eggs, moreover the *Clamator* eggs often take a stain from any damp falling on them, making marks, dark blue in colour, which at once differentiate them from any Passerine egg. So close are the eggs in appearance to those of the fosterers that often many Cuckoos' eggs are found in one nest, showing obviously by size and shape that they belong to two, three or even four females. The net result is that only one Cuckoo, the strongest or first-hatched of the lot, survives, the rest being outed one by one, together with the young Babblers, until it reigns alone in the nest. This is an interesting instance of the numerical strength of a species being itself a check on over-production. If every Cuckoo could tell that there was already a Cuckoo's egg in a nest it would almost certainly seek another, and so the fosterers necessary to keep up the stock of Cuckoos would soon become exhausted, as they would have no chance of rearing their own young.

Over the greater part of India the breeding-season commences in the beginning of June and lasts through July and the greater part of August. In the Hills up to 5,000 feet May and June are the egg-laying months, whilst in the Nilgiris it lays in January, February and March. Every now and then eggs are seen in other birds' nests but the number is negligible. They have been taken in those of Bulbuls, two or three species each of *Trochalopterum* and *Garrulax*, which lay blue eggs, *Alcippe*, *Lanius*, *Enicurus* and *Geocichla citrina*.

One hundred eggs average about 23·9×18·6 mm., but vary greatly in size.

Habits. The Pied Crested Cuckoo may be found in almost any kind of country so long as it is fairly well-wooded and it is common in light forest, scrub, bamboo and even in dense evergreen forest, this especially in Assam, Lower Burma and the Malabar Coast. It is a much less rapid flier than any of the preceding Cuckoos but at the same time can go at considerable speed when pressed. Its call is a very wild metallic double note, not unmusical when the bird is in full voice, but very harsh at the beginning and end of the season. It also has a considerable number of unpleasant cackling and screamings, rather reminding one of the English Jay. It feeds quite as much on grasshoppers as on caterpillars but in addition to these two main articles of diet will eat any insects, as well as wild blackberries and raspberries and, it is said, occasionally seeds.

It is for the most part a bird of low elevations, wandering up to 5,000 feet in Assam to about 8,000 feet in the Himalayas but the Everest Expedition obtained one specimen at 14,000 feet in Tibet, and Babault obtained a second at Rotung, Lahul, at about 12,000 feet.

(1473) Clamator jacobinus taprobanus.

THE CEYLON PIED CRESTED CUCKOO.

Clamator jacobinus taprobanus Hartert, Nov. Zool., xxii, p. 254 (1915) (Ceylon).
Coccystes jacobinus. Blanf. & Oates, iii, p. 225 (part).

Vernacular names. *Konday kōhā* (Cing.); *Kondai-kuyil* (Tam.).

Description. Exactly the same as *C. j. jacobinus* but smaller.

Colours of soft parts as in the typical race.

Measurements. Wing, 20 specimens, 132 to 141 mm.; tail 161 to 169 mm.; tarsus about 28 mm.; culmen about 20 to 21 mm.

Distribution. Ceylon only.

Nidification. In Ceylon Wait and Phillips have taken the eggs of this Cuckoo from November to June and again in August. They are indistinguishable from those of the preceding race, and are deposited principally in the nest of *Turdoides griseus striatus*

Wait points out that the eggs of this Cuckoo have the white tinged with green instead of colourless as in the Babbler's egg.

Habits. Those of the species. It is found in Ceylon up to 3,000 feet. Wait remarks that he has seen this Cuckoo in flocks of as many as twelve, perched on low rushes in swampy ground, feeding on flies.

(1474) Clamator coromandus.

THE RED-WINGED CRESTED CUCKOO.

Cuculus coromandus Linn., Syst. Nat., 12th ed. i, p. 171 (1766) (Coromandel Coast).
Coccystes coromandus. Blanf. & Oates, iii, p. 226.

Vernacular names. *Yerra gola kokila* (Tel.); *Tseben* (Lepcha).

Description. Sides of head, crest and nape black with a blue gloss, the feathers of the crest cross-rayed; hind-neck white, forming a half-collar; back, scapulars, the wing-coverts next them and the innermost secondaries black glossed with steel-green; rump, upper tail-coverts and tail black glossed with deep purple-blue, grading into the green gloss of the lower back; outer tail-feathers narrowly tipped with white; wings chestnut, the tips of the quills dusky; chin, throat and extreme upper breast pale ferruginous, varying a good deal in depth of colour; breast and abdomen white; flanks and vent pale dusky brown; under tail-coverts black, with a dull blue gloss; under wing-coverts pale ferruginous: axillaries fulvous-white.

Colours of soft parts. Iris pale reddish-brown; bill black, the base of the lower mandible generally paler and yellowish; gape at corner and mouth salmon-pink; legs and feet plumbeous or slaty-brown.

Measurements. Wing 157 to 166 mm.; tail 231 to 245 mm.; tarsus about 27 to 28 mm.; culmen about 24 to 25 mm.

Young birds are brown above, the upper plumage feathers and the wing-coverts broadly edged with rufous; below white.

At a later stage when the black glossy plumage is first assumed many feathers, especially on the wings, are still fringed with rufous and the tail is tipped with dull buff rather than white.

Distribution. Common in Ceylon; rare on the Malabar Coast and the Nilgiris; equally rare in Madras, whence it has been recorded from Trichinopoly and Madras City; it has been once recorded from Chota Nagpore. In the Himalayas it is common from Garhwal and Kuman to the Assam Hills, North and South of the Brahmaputra; thence it extends through Burma, the Malay States, Borneo, the Philippines and Celebes; East it is found throughout Western and Southern China and the Indo-Chinese countries.

Nidification. The Red-winged Crested Cuckoo breeds during May and June in Assam, many eggs being found in April and

others up to the end of August; in Burma, April and May are the principal breeding months and the same in Western India and in the Western Himalayas. The fosterers selected are *Grammatoptila* in the Western Himalayas and *Garrulax pectoralis* and *G. moniliger* in Assam and Burma. It is not known how many eggs this Cuckoo lays but I have found up to eight and nine eggs within comparatively small, well-marked areas, haunted by a single female, which appear to be the product of one bird. These were nearly always deposited in the nests of the *Garrulax* mentioned, the two most common forms, but when the nests of these were exhausted they were then dropped in those of *G. gularis*, *G. leucolophus* or of various species of *Trochalopterum* and *Ianthocincla*. This Cuckoo, probably generally, certainly sometimes, lays its egg direct into the fosterer's nest. One female was trapped on the nest as we were watching and she slipped on to the nest, evidently intending to sit in it. A second I shot as she flew off the nest, on to which I watched her and in which she had laid an egg. At odd times eggs may be found in any nest, simply placed there when the Cuckoo could not find her proper fosterers. They have been seen in the nests of *Copsychus*, *Geocichla* and even in so small and unsuitable a nest as that of *Alcippe*. In my experience most of the latter nests are deserted when cuckolded, but Fielden says that he saw young *Clamator coromandus* frequently being fed by Quaker-Thrushes (*Alcippe*). The eggs are like those of *C. jacobinus* but very much larger and much paler, in fact much the same in size and colour as the eggs of *Garrulax pectoralis* but spheroidal instead of long, pointed ovals. Fifty eggs average 26·9 × 22·8 mm.: maxima **29·9** × 22·9 and 26·9 × **24·4** mm.; minima **25·4** × 21·7 and 26·3 × **20·3** mm.

Both sexes seem to be quite indiscriminate in their pairing, though where they are uncommon a pair will continue in company during the breeding-season.

Habits. This Crested Cuckoo frequents any kind of jungle or forest, soon calling attention to its presence by its very loud harsh screaming, which it constantly utters in the breeding-season and fairly often at other times. It frequently collects in small flocks, especially when there is any tempting food in abundance, such as termites, a plague of caterpillars or a hatching of locusts. They probably also eat a good deal of fruit and berries.

It is found in the broken country at the foot of the hills and ascends the latter up to 5,000 or 6,000 feet. In Assam and Burma it is more common below 2,500 feet than above this height but in the Western Himalayas is common up to 5,000 feet and wanders up to 8,000 feet.

Subfamily EUDYNAMINÆ.

This Subfamily appears necessary, as the one genus I consider it should contain, whilst structurally coming very close to the *Phœnicophainæ*, differs from it totally in habits. *Eudynamis*, the genus under reference, consists of arboreal birds which are parasitic in their habits, whilst all the genera of the *Phœnicophainæ* are more or less terrestrial and are non-parasitic, building their own nests. Structurally the subfamily differs from the *Phœnicophainæ* in its much longer, more pointed wing. Feathers of head and neck normal, not spiny. The tarsus is naked; the wing rather short and rounded, the third quill longest or equal to the fourth; the tail rather long, graduated and broad. The accessory femoro-caudal is present; the pectoral tract of feathers divides opposite the articulation of the humerus into two branches which terminate separately.

Genus EUDYNAMIS.

Eudynamis Vigors & Horsf., Trans. Linn. Soc., xv, p. 303 (1826).

Type, *Cuculus cyanocephalus* Lath. Australia.

In this genus the bill is stout with the culmen strongly rounded; the wing and tail are equal in length, the latter graduated; tarsi long and stout, scutellated in front, naked except just next to the thigh; sexes dissimilar; young like the male.

Eudynamis scolopaceus.

Key to Subspecies.

A. Smaller; culmen under 32 mm..... *E. s. scolopaceus*, p. 172.
B. Larger; culmen 32 mm. or over..... *E. s. malayana*, p. 174.

(1475) Eudynamis scolopaceus scolopaceus.

THE INDIAN KOEL.

Cuculus scolopaceus Linn., Syst. Nat., 10th ed., i, p. 111 (1758) (Bengal).
Eudynamis honorata. Blanf. & Oates, iii, p. 228.

Vernacular names. *Koel* (Hind.); *Kokil* (Beng.); *Kokila*, *Nallak* ♂, *Podak* ♀ (Tel.).

Description.—Adult male. Black all over with a deep blue gloss.

Colours of soft parts. Iris crimson; bill apple-green, black at the base and dusky round the nostrils; legs and feet plumbeous, claws horny.

Measurements. Wing 185 to 206 mm.; tail 182 to 202 mm.; tarsus about 35 to 36 mm.; culmen about 28 to 31 mm.

Female. Above dark brown with a steel-green gloss, the head generally paler and more rufous, spotted with white everywhere, more streaky on the head and turning to bars on the tail-feathers and wing-quills; lower plumage white, chin, throat and fore-neck with black bases and edges to the feathers turning to bars on the breast, abdomen, flanks and under tail-coverts.

In some specimens the under surface is more rufescent white and the spots on the upper parts tinged with rufous. This is especially the case in Eastern Bengal, where the birds closely approach the Burmese form.

Nestling black all over but moulting quickly into the adult plumage.

Distribution. Ceylon and all India. Rare in Sind and the Punjab and absent from the North-West Provinces.

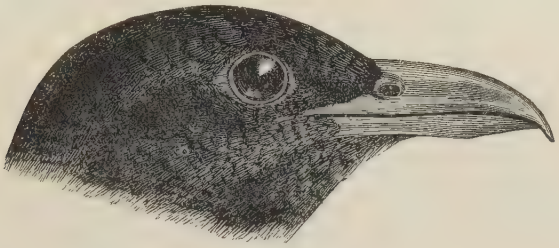

Fig. 26.—Head of *E. s. scolopaceus*, ♀. ½.

Nidification. The Indian Koel, whether of this or the next race, is parasitic on the *Corvidæ*; in India, Ceylon, Burma, etc., it deposits its eggs in the nests of *Corvus splendens*, *C. coronoides* and their various subspecies, suiting its own breeding-period to that of the Crows. In many cases they have two periods. For instance, in Dacca they have two distinct breeding times: in December and January they lay in the nests of *C. coronoides*; in March and April no eggs are found, but in the end of May, when the House-Crow starts building, the Koel also recommences pairing and lays in Crows' nests in June. In the Shan States and in parts of North-East Burma the Koel cuckolds the Magpie, *Pica pica sericea*, whilst in China she makes use of this bird and also the Magpies of the genus *Urocissa* and, stranger still, often lays in the nests of the Starling, *Graculipica*. The Koel's eggs are very much like those of the Crow's; the ground-colour is pale stone, pale greenish-yellow or yellowish-grey and they are profusely marked all over with various blotches, freckles, specks and spots of reddish-brown; in most cases, however, having the prevailing tone green. The colour seems to vary to some extent geographically with the prevailing character of the host's eggs, being paler and more red when the Crow's eggs are of this description and darker and more rich green when the Crow's

eggs are of this type. The Koel sometimes, if not always, lays its eggs directly into the Crow's nest, the action being one of a second or two only, but much yet remains to be learnt about this most common bird. I have never seen Crows feeding more than one young Koel but many observers record having seen young Crows and Koels together. As many as 13 Koel's eggs have been found in one nest and the females seem to have no definite breeding-area. One hundred eggs average 31·0 × 23·6 mm.

Habits. The Koel is found everywhere from the Plains up to about 2,500 feet in the hills and is most common in and about towns and villages with its hosts, the Crows. Its most unpleasant cry of "You're ill, you're ill" reverberates all round one, day and night from April until August. Though partly insectivorous, it certainly also eats fruit and berries as its main diet and in captivity is fed on "suttee" and mashed bananas. Its flight is very strong and rapid and it easily evades the pursuit of the Crows it victimizes, though these latter pursue it with vindictive cawings and abuse whenever it shows itself.

(1476) Eudynamis scolopaceus malayana.

THE MALAY KOEL.

Eudynamis malayana Cab. & Heine, Mus. Hein., iv, p. 52 (1862) (Sumatra).
Eudynamis honorata. Blanf. & Oates, iii, p. 228 (part).

Vernacular names. *Kokil* (E. Bengal); *Kokil-sorai* (Assam); *Ou-au* (Burm.).

Description.—Male. Exactly like *E. s. scolopaceus*.

Colours of soft parts as in that bird.

Measurements. Wing 190 to 221 mm.; tail 181 to 203 mm.; tarsus about 35 to 37 mm.; culmen 32 to 34 mm.

Female. Much more rufescent both above and below than typical birds from Ceylon and continental India.

Nestling. Black.

Distribution. Assam, Burma, Malay Peninsula to Sumatra, Indo-Chinese countries to Western China.

Hartert (Nov. Zool. x, 1903, p. 236) confines *malayana* to Sumatra and unites birds from all the other places mentioned with *scolopaceus*. Everywhere, however, from the extreme East of Bengal eastwards one only gets rufous females and this seems to me a greater differentiating factor than the very small differences in size. It must, however, be remembered that young females are more rufous in their first year than in the second.

Nidification and **Habits.** Exactly similar to that of the preceding race and fully dealt with under that bird.

Subfamily PHŒNICOPHAINÆ.

This Subfamily contains the non-parasitic Cuckoos with short rounded wings and poor flight but, on the other hand, with powerful, completely naked tarsi and terrestrial habits.

It differs also from the preceding subfamily in that all its species have the feathers of the head and neck more or less spiny and in being non-parasitic.

The other characters are as in the preceding subfamily.

Sexes alike; young different to the adults but never all black.

Key to Genera.

A. Claws of all toes about the same in length.
  a. Feathers of back and breast not spiny.
    a'. Bill red throughout ..... ZANCLOSTOMUS, p. 175.
    b'. Bill wholly or partly apple-green.
      a''. Culmen much curved throughout. Sexes alike.
        a^3. Tail-feathers with white tips.
          a^4. Naked sides of face not united across forehead ..... RHOPODYTES, p. 176.
          b^4. Naked sides of head united .. PHŒNICOPHAUS, p. 182.
        a^3. No white on tail-feathers ..... RAMPHOCOCCYX, p. 181.
      b''. Culmen almost straight, except at tip. Sexes dissimilar ..... RHINORTHA, p. 183.
  b. Breast and back feathers spiny ..... TACCOCUA, p. 185.
B. Claw of hallux much lengthened and nearly straight ..... CENTROPUS, p. 189.

Genus **ZANCLOSTOMUS.**

Zanclostomus Swains., Class. Birds, ii, p. 323 (1837).

Type, *Phœnicophaes javanicus* Horsf.

Bill compressed, moderately deep; culmen much curved; nostril elongate and longitudinal; a small naked space round the eye; feathers of the head and throat spiny; wing very short and rounded, the primaries hardly exceeding the secondaries in length; tail very long and greatly graduated, the outermost pair about half the length of the central ones.

(1477) **Zanclostomus javanicus.**

THE LESSER RED-BILLED MALKOHA.

Phœnicophaes javanicus Horsf., Trans. Linn. Soc., xiii, p. 178 (1822) (Java).
Zanclostomus javanicus. Blanf. & Oates, iii, p. 230.

Vernacular names. None recorded.

Description. Upper parts ashy-grey, the wings and rump darker and glossed with green, the concealed portions of the quills black; tail dark ashy-grey, cross-rayed obsoletely with black

and with broad white tip; lores mixed rufous and grey; feathers round the eye and upper ear-coverts grey; sides of head, lower ear-coverts, chin, throat and breast pale rufous-ochre, varying a good deal in depth; breast and anterior abdomen grey washed with rufous; posterior abdomen, vent and under tail-coverts rich rufous.

Colours of soft parts. Iris brown; orbital skin blue; bill coral-red; legs and feet dull slaty or plumbeous.

Measurements. Wing 141 to 150 mm.; tail 252 to 270 mm.; tarsus about 34 to 35 mm.; culmen about 30 to 34 mm.

Distribution. Java, Borneo, Sumatra and Malay Peninsula, North into Tenasserim as far as Tavoy; South-West Siam.

Nidification. A nest containing two eggs of this Cuckoo was obtained by Major J. C. Moulton at Keiching, Borneo, on the 10th March. The nest is described as "a flimsy affair of grass blades and twigs placed in a thick bush in scrub-jungle." The two eggs are quite typical of this subfamily of non-parasitic Cuckoos; originally white, or creamy-white, the inner shell is covered with calcareous deposit, the surface of which is very smooth and polished without being glossy and this is stained all over with very pale yellowish-grey, enough to make the eggs look a dirty white if carefully examined. In shape they are broad ellipses, both ends practically the same, and they measure 29·8 × 23·8 mm. and 28·5 × 22·6 mm.

Habits. Davison records the habits as being similar to that of *Rhopodytes* and says that they frequent the outskirts of forest and undergrowth.

Genus **RHOPODYTES.**

Rhopodytes Cab. & Heine, Mus. Hein., iv, p. 61 (1862).

Type, *Melias diardi* Less.

The bill in this genus is deeper than in *Zanclostomus* and is apple-green in colour; the nostril is small, rounded or oval, and oblique; the orbital naked space is larger, though divided by a narrow strip of feathers on the forehead.

Species of this genus are found practically throughout the Oriental Region, four being found within our limits.

Key to Species.

A. Abdomen grey or blackish.
  a. Orbital skin blue ..... *R. viridirostris*, p. 177.
  b. Orbital skin red.
    a'. Wing over 145 mm..... *R. tristis*, p. 178.
    b'. Wing under 140 mm. ..... *R. diardi*, p. 180.
B. Abdomen ferruginous red ..... *R. sumatranus*, p. 180.

(1478) Rhopodytes viridirostris.

THE SMALL GREEN-BILLED MALKOHA.

Zanclostomus viridirostris Jerdon, Madr. Journ. Lit. Sci., xi, p. 223 (1840) (Coonoor).
Rhopodytes viridirostris. Blanf. & Oates, iii, p. 231.

Vernacular names. *Kappra*, *Popiya* (Hind.); *Wamana kaki* (Tel.); *Kusil* (Tam., Ceylon); *Mal-kaendetta*, *Kalahā-koha* (Cing.).

Description. Upper parts dark ashy-grey, glossed faintly with olive-green; wing-quills and tail darker and more strongly glossed, the latter tipped with white and cross-rayed darker still; the lores grey; feathers of the chin and throat bifurcate, the bifurcated portion yellowish, giving a streaked appearance; breast grey, more or less suffused with rufous, especially next the abdomen; abdomen and under tail-coverts dark ashy-grey; axillaries and under wing-coverts very dark grey.

Colours of soft parts. Iris blood-red to crimson; orbital skin cobalt-blue; bill bright apple-green, legs and feet olive-slate to greenish-black.

Measurements. Wing 131 to 142 mm.; tail 225 to 255 mm.; tarsus about 32 to 34 mm.; culmen about 27 to 29 mm.

Distribution. Ceylon and South India. On the West as far North as Belgaum and Ratnagiri and on the East to Godavery and Cuttack. Ball also records it from Midnapore.

Nidification. The breeding-season of this Malkoha seems to be unrestricted, for between them Wait, Phillips and Jenkins have taken eggs in every month of the year. Wait, in a letter to me, describes the nests as follows:—"They prefer rather scrubby jungle and build at a height from the ground of six to ten feet in thorny bushes. The nest is like a substantial Dove's nest, but the twigs are much more numerous, being piled up to the thickness of an inch. There are always a few green leaves by way of lining. The usual number of eggs appears to be two but I have once found three. The bird sits fairly close but its courage fails at the last moment and it flops out of the bush, if you pass within five yards, in an agitated manner, which gives it away at once."

The eggs are quite typical and exactly like those of *Zanclostomus*, already described. They average about 29·4 × 24·7 mm.

Habits. The Small Green-billed Malkoha frequents forest- or scrub-jungle and is seldom seen in the open. According to Legge it is almost entirely frugivorous in Ceylon, only occasionally eating insects; in South India, however, Jerdon considered it to be principally insectivorous, searching bushes and trees for *mantidæ*, grasshoppers, etc. Like most of its tribe, it is a great skulker and much prefers to seek safety by foot rather than by wing and it is very expert in threading its way through

tangled scrub and dense bushes. Its note is said to be a low croak, sounding like "kraa," but it is a very silent bird.

Rhopodytes tristis.

Melias tristis Lesson, Traité d'Orn., p. 132 (1831).

Type-locality: Bengal.

Key to Subspecies.

A. Larger; wing over 165 mm.; breast washed with ochre ..... *R. t. tristis*, p. 178.
B. Smaller; wing under 165 mm.; breast pure grey ..... *R. t. longicaudatus*, [p. 179.

(1479) Rhopodytes tristis tristis.

The Large Himalayan Green-billed Malkoha.

Melias tristis Lesson, Traité d'Orn., p. 132 (1831) (Bengal).
Rhopodytes tristis. Blanf. & Oates, iii, p. 232 (part).

Vernacular names. *Bon Kokil* (Beng.); *Sanku* (Lepcha); *Wapalai* (Burm.).

Description. Above very like the preceding bird but darker and with a deeper green gloss; lores black; forehead grey; the shafts of the feathers of the forehead and anterior crown black and bristly; chin, throat and sides of the head ashy-grey, strongly tinged with ochre, darkening on the breast and becoming blackish on the vent, posterior abdomen and under tail-coverts; the feathers of the chin, throat and breast with black bristly shafts showing up strongly as striations on these parts.

Colours of soft parts. Iris brown to crimson; orbital skin crimson, a duller red in the non-breeding season; bill apple-green, tinged with red about the base and gape; legs and feet dull brownish- or slaty-green.

Measurements. Wing 166 to 180 mm. (one, 164 mm.); tail 360 to 394 mm.; tarsus about 40 mm.; culmen about 31 to 33 mm.

Distribution. The outer Himalayas from Kuman and Garhwal to Eastern Assam, Bengal and possibly Chota Nagpore and Northern Circars (*Jerdon*), Chin Hills and extreme Northern Burma to Shan States.

Nidification. This Malkoha breeds from early April to the end of August, probably often having two broods. In Assam, though most common up to about 2,500 feet, they ascend and breed in some numbers up to 5,000 feet, and in the Eastern Himalayas even some 2,000 feet higher. The nest is rather like a glorified Dove's nest, a platform of twigs sometimes mixed with a few roots and scraps of grass and nearly always lined with green leaves. As a rule it is placed in a thick, high bush or small

sapling at any height between three and ten feet from the ground. Occasionally I have found the nest built in a clump of bamboos in bamboo-jungle but more often it is built either in evergreen forest, mixed forest or in scrub-jungle. The eggs number two to four and are of the usual description but are often rather long ovals in shape, though always obtuse at the smaller end. Fifty eggs average 33·8×25·8 mm.: maxima **36·1×26·9** and 34·1×**27·9** mm.; minima **27·8×20·7** mm. The hen bird is a very close sitter, often not moving until one is within arm's reach of the nest.

Habits. This Cuckoo, and I think all the other members of this subfamily, seem to pair for life, as the two birds are always together, summer and winter. They are essentially forest and jungle birds and I have never seen them in open country or grass-land, except when passing from one patch of forest to another. They keep much either to the ground or the lower bushes and bamboos but sometimes, probably enticed by food, they clamber up into the higher branches of forest trees. They feed principally on insects, small grasshoppers and small lizards etc., also taking a certain amount of fruit and seeds, for I have taken the latter from their stomachs together with fruit-stones. Their ordinary call is a soft chuckling note but they are very silent birds, skulking in and out of the undergrowth, loath to fly unless pressed but, once on the wing, very much more active and quick than Cuckoos of the genus *Centropus*.

(1480) Rhopodytes tristis longicaudatus.

THE LARGE MALAY GREEN-BILLED MALKOHA.

Phœnicophanes longicaudatus Blyth, J. A. S. B., x, p. 923 (1841) (Moulmein).
Rhopodytes tristis. Blanf. & Oates, iii, p. 232 (part).

Vernacular names. *Wapalai* (Burma).

Description. Similar to the preceding race but with little or no trace of ochre on the lower plumage and the chin, throat and breast decidedly paler; the grey of the head and back is generally darker; the white tips to the tail-feathers are rather shorter and are less consistently square across the tips.

Colours of soft parts as in the other races.

Measurements. Wing 148 to 163 mm.; tail 352 to 393 mm.; tarsus about 38 to 39 mm.; culmen 30 to 32 mm.

Distribution. Burma, except perhaps the extreme North-West, Siam, Southern Shan States, Malay Peninsula.

Nidification. Similar to that of the preceding bird. Herbert found eggs from May to August in Siam, whilst Hopwood and Mackenzie found them from March to July in Tenasserim. Fifteen eggs average 32·8×25·9 mm.: maxima **36·0**×26·1 and

33·4×27·3 mm.; minima 31·1×25·0 mm. The number of eggs laid is generally two, less often three.

Habits. Those of the species.

(1481) Rhopodytes diardi.

DIARD'S GREEN-BILLED MALKOHA.

Melias diardi Lesson, Traité d'Orn., p. 132 (1831) (Sumatra).
Rhopodytes diardi. Blanf. & Oates, iii, p. 233.

Vernacular names. None recorded.

Description. A small but dark and richly-coloured replica of *R. t. tristis*; the lores more bare of feathers; the underparts purer ashy and the black ascending further up the abdomen from the vent.

Colours of soft parts as in *R. t. tristis*.

Measurements. Wing 125 to 136 mm.; tail 221 to 229 mm.; tarsus about 32 to 33 mm.; culmen 29 to 30 mm.

Distribution. From the latitude of Mergui in Tenasserim, through the Malay Peninsula to Sumatra.

Nidification. Kellow found this Cuckoo breeding in the foothills near Perak in March and Hopwood took two hard-set eggs on the 21st April in Tavoy, South Tenasserim. Nest and eggs are like those of *R. tristis* but two of the latter seem to form a full clutch. Eight eggs average 31·6×25·2 mm.: maxima 33·6×26·5 mm.; minima 29·0×25·1 and 30·8×23·8 mm.

Habits. Those of the genus.

(1482) Rhopodytes sumatranus.

THE RUFOUS-BELLIED MALKOHA.

Cuculus sumatranus Raffles, Trans. Linn. Soc., xiii, p. 287 (1822) (Sumatra).
Rhopodytes sumatranus. Blanf. & Oates, iii, p. 233.

Vernacular names. None recorded.

Description. A narrow edge of black feathers next the sides of the bill; remainder of head, neck and breast deep ashy-grey, a little paler on the chin and throat; back, rump, upper tail-coverts, exposed portions of wings and tail metallic green, the tail with white tips and the outer feathers more blue; primaries deep metallic blue on both webs; abdomen, vent, posterior flanks and under tail-coverts deep rufous-bay or chestnut; the feathers of the forehead and chin are inconspicuously black-shafted and bristly. The nostrils are long and oblique.

Colours of soft parts. Iris pale blue; orbital skin orange, palest next the eye; bill pale green; legs and feet plumbeous green.

Measurements. Wing 138 to 153 mm.; tail 215 to 224 mm.; tarsus about 34 to 35 mm.; culmen about 32 to 34 mm.

Distribution. Tenasserim and peninsular Siam to Sumatra.

Nidification. Unknown.

Habits. Those of the genus. Davison says that it was a very common bird on the island of Mergui, frequenting the secondary scrub which covers so much of it.

Genus **RHAMPHOCOCCYX.**

Rhamphococcyx Cab. & Heine, Mus. Hein., iv, p. 65 (1862).

Type, *Phœnicophaus calorhynchus* Temm.

I follow Blanford in uniting *Rhamphococcyx*, *Dryococcyx* and *Urococcyx*. These genera have been divided almost entirely on nasal characters, which, in this particular instance, seem to me to be of less importance than colour and colour-pattern, characters in which these birds show the very closest affinity to one another, in some cases being practically alike in these respects.

This genus differs from the last in having the naked skin more restricted in extent and not passing across the forehead. It also possesses small eyelashes and has no white on the tail-feathers.

(1483) **Rhamphococcyx erythrognathus.**

THE CHESTNUT-BREASTED MALKOHA.

Phœnicophaes erythrognathus Hartl., Verz. Mus. Brem., p. 95 (1844) (Sumatra).
Rhamphococcyx erythrognathus. Blanf. & Oates, iii, p. 235.

Vernacular names. None recorded.

Description. Forehead to nape slaty-green, with very little gloss, passing into brilliant metallic green on the remainder of the upper plumage; exposed portions of wings green, the quills more bluish on the outer webs and blue-black on the inner; tail metallic green with broad terminal bands of deep chestnut, showing narrow tips of green in fresh plumage; some specimens show traces of white on the supercilium and above the narrow grey cheeks; chin, throat, breast and lower tail-coverts chestnut, palest on the chin and deepening to almost black on the abdomen and posterior flanks, which, with the thigh-coverts, are more or less glossed with green.

Colours of soft parts. Irides blue to pale blue in the male, yellow in the female; bill pale green, the base of the upper and most of the lower deep blood-red; legs and feet dark plumbeous.

Measurements. Wing 158 to 177 mm.; tail 239 to 270 mm.; tarsus about 41 to 42 mm.; culmen 39 to 42 mm.

Distribution. From about Yea in Tenasserim, through the Malay Peninsula and peninsular Siam to Sumatra and Borneo.

Nidification. Kellow found this Malkoha breeding in the Malay States in February and March near Taiping. The nests were "very rough platforms of sticks lined with leaves and so shallow that it seemed the eggs must roll out in a wind. Built on tall bushes in evergreen forest." In each case there were two eggs measuring about 34·9 × 26·4 mm. They are quite typical Malkoha's eggs in every respect.

Habits. Nothing recorded beyond the fact that in habits, voice, flight and food they differ in no way from *Rhopodytes*. They are said to keep in preference to scrub-jungle and secondary scrub but also to frequent open forest and gardens.

Genus PHŒNICOPHAUS.

Phœnicophaus Vieill., Analyse, pp. 27, 70 (1816).

Type, *Cuculus pyrrhocephalus* Forster.

In this genus the bill is stout, wide and high at the base, compressed at the front and with the culmen curved throughout. Nostrils placed closer to the commissure, narrow slits in shape; sides of the head and neck bare and papillose, the bare skin extending across the forehead next the bill; tail, wings and bristly shafts to throat and forehead as in *Rhopodytes*. Sexes alike.

(1484) Phœnicophaus pyrrhocephalus.

THE RED-FACED MALKOHA.

Cuculus pyrrhocephalus Pennant, Ind. Zool., p. 66 (1769) (Ceylon).
Phœnicophaës pyrrhocephalus. Blanf. & Oates, iii, p. 234.

Vernacular names. *Mál-kendetta*, *Mal-koha* (Cing.).

Description. Feathered portion of crown, nape and neck black, glossed green and each feather edged white at the tips; upper plumage and wings dark metallic blue-green with here and there a blue sheen, the primaries being all of this tint on the outer and blue-black on the inner webs; tail-feathers more bronze-green with broad white terminal bands; chin and cheeks white with black shafts and bristles; throat and breast black, the feathers next the white lower breast with white terminal spots; remainder of lower parts white, the thigh-coverts mixed with black.

Colours of soft parts. Iris brown in males, white in females; bill apple-green, dusky about the nostrils and base; legs and feet bluish-green.

Measurements. Wing 150 to 165 mm.; tail 265 to 288 mm.; tarsus about 38 to 39 mm.; culmen about 36 to 38 mm.

Distribution. Ceylon and the extreme South of Travancore, where it has been obtained by Stewart.

Nidification. One of my collectors obtained nests of this bird in January and May and Stewart took others in April and May. The nests were typical Malkoha's nests, shallow saucers of grass, twigs and roots placed in high bushes in forest with thick undergrowth. The eggs, two or three in number, are just like others of this subfamily, but are rounder than those of the Malkohas and more like those of *Centropus*. Twelve eggs average 35·8×27·0 mm.: maxima 36·9×27·3 and 34·8×29·7 mm.; minima 32·5×28·3 and 33·9×25·3 mm.

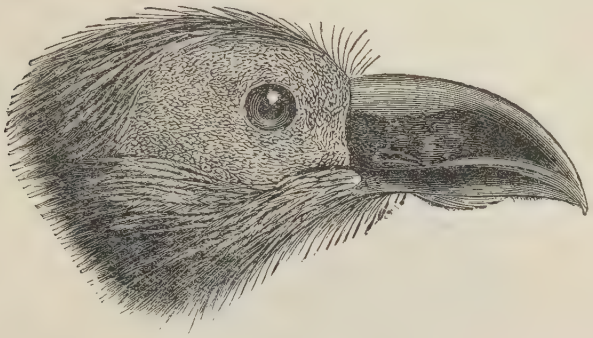

Fig. 27.—Head of *P. pyrrhocephalus*. ½.

Habits. Wait describes this as a very shy bird, haunting the wilder stretches of forest away from cultivation. It is said to be almost entirely a fruit-eater but occasionally to take insects also, feeding high up in tall trees and flying feebly from one tree to another. Legge says that the only note he has heard sounds like "Kaa," uttered by the birds when flying as a call to the other members of its flock. It ascends the mountains to about 2,500 feet. Natives esteem its flesh highly and Legge says it is tender and pleasant to the taste.

Genus **RHINORTHA.**

Rhinortha Vigors, Mem. Raffl., p. 671 (1830).

Type, *Cuculus chlorophæus* Vigors.

The genus *Rhinortha* has the naked orbital area much restricted; the bill is longer in proportion than in the preceding genera, more compressed, straighter and more slender; the nostril is oval and longitudinal; wing short and rounded, the fifth primary longest; the tail broad, long and strongly graduated; the feathers of the fore-crown and chin spiny.

Sexes differing in colour.

(1485) Rhinortha chlorophæa chlorophæa.

RAFFLES'S GREEN-BILLED MALKOHA.

Cuculus chlorophæus Raffl., Trans. Linn. Soc., xiii, p. 288 (1822) (Sumatra).
Rhinortha chlorophæa. Blanf. & Oates, iii, p. 236.

Vernacular names. None recorded.

Description.—Male. Head, neck, scapulars, upper back, wing-coverts and quills bright chestnut, lightest on the head and the wing-quills tipped dusky; lower back brown; rump, upper tail-coverts and tail dull black with narrow bars of grey and a white tip to the tail-feathers: chin, throat and breast a paler chestnut than the head, merging into dark dull brown on the posterior flanks, abdomen and under tail-coverts, these parts indistinctly barred with fulvous grey.

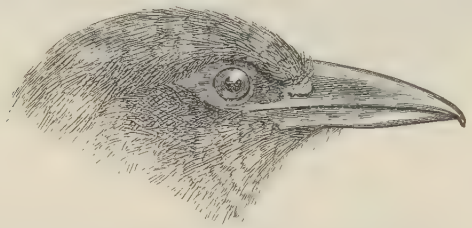

Fig. 28.—Head of *R. c. chlorophæa.* ½.

Colours of soft parts. Iris dark brown; orbital skin pale green or bluish-green; bill apple-green; legs and feet dark plumbeous.

Measurements. Wing 111 to 122 mm.; tail 172 to 184 mm.; tarsus about 25 to 26 mm.; culmen about 27 to 28 mm.

Female. Head, neck and upper back grey; wings and back as in the male; rump chestnut-brown, obsoletely cross-rayed; tail chestnut tipped white and subtipped black; chin, throat and breast pale grey, more or less washed with fulvous, passing into rufous-buff on the lower breast and abdomen and into chestnut-brown on the vent, thighs, posterior abdomen and under tail-coverts.

Young unknown, but probably more like the male than the female, as the two or three female specimens in the British Museum show signs of the adult male plumage.

Distribution. From Yea in Tenasserim and Mapret in Siam, through the Malay Peninsula to Sumatra.

Nidification. Kellow took a nest of this bird with three eggs in heavy forest near Taiping in January and one of my collectors took another with a single egg in forest some 20 miles South

of Yea. The eggs are large for the size of the bird, measuring about 34·0 × 25·0 mm. The nest is said to be like that of *Rhopodytes* but with more grass used in its construction.

Habits. Davison says that this Cuckoo frequents the thickest parts of evergreen forests, cane-brakes and densest of scrubby jungles. In all its habits it resembles *Rhopodytes* but has quite a different note, a peculiar cat-like mew. It is generally found in pairs and all those examined had fed entirely on insects.

Genus **TACCOCUA.**

Taccocua Lesson, Traité d'Orn., p. 148 (1831).

Type, *Centropus sirkee* Gray.

In *Taccocua* the bill is shorter, deeper and much more curved than in *Rhinortha* and is distinctly festooned near the base. A row of coarse bristles surrounds the eye except behind; the plumage of the head, neck, upper breast and upper back is spinous, the shafts of the feathers projecting; the tarsus is strong and the claws short and curved; tail long and graduated with long upper tail-coverts; wing short and rounded.

Sexes alike.

The genus contains but one species, restricted to India.

The name *sirkee* dates from 7th April, 1831 (Kinnear, Ibis, 1925, p. 489) and is therefore antedated by *leschenaulti* of Lesson, 1830. The great majority of Hardwicke's birds were obtained in or about Cawnpore and this may be accepted as the type-locality of *sirkee*.

Taccocua leschenaulti.

Key to Subspecies.

A. Pale rufous on the lower parts.
  a. Darker, wing 144 to 160 mm. ..... *T. l. leschenaulti*, p. 185.
  b. Paler, wing 145 to 169 mm. ..... *T. l. sirkee*, p. 187.
  c. Palest, wing 153 to 186 mm. ..... *T. l. infuscata*, p. 187.
B. Deep rufous on the lower parts ..... *T. l. affinis*, p. 188.

(1486) Taccocua leschenaulti leschenaulti.

THE SOUTHERN SIRKEER CUCKOO.

Taccocua leschenaulti Lesson, Traité d'Orn., p. 144 (1831) (India: restricted to Kanara, Bombay); Blanf. & Oates, iii, p. 237 (part).

Vernacular names. *Jangli Tota* (Hind.); *Adavi-chilluka*, *Potu-chilluka* (Tel.).

Description. Upper parts light earthy-brown with a green satiny sheen on wings and tail and more or less on back as well; the whole crown, sides and back of neck and extreme upper back with shining black shafts, bristly and prolonged beyond the webs; traces of a supercilium white; short feathers of the eyelid white,

the prolonged bristles black; tail with broad white tips to the lateral feathers and the rest almost black, all the tail-feathers cross-rayed darker; chin, throat and upper breast greyish-rufous or brown with bristly black shaft-stripes, remainder of lower parts rufous, varying considerably in depth of colour; under tail-coverts dark brown.

Colours of soft parts. Iris reddish-brown to crimson; bill cherry-red, the tip paler and more yellow, the base darker; legs and feet plumbeous or slaty-brown.

Measurements. Wing 144 to 160 mm.; tail 208 to 237 mm.; tarsus about 38 to 39 mm.; culmen 26 to 28 mm.

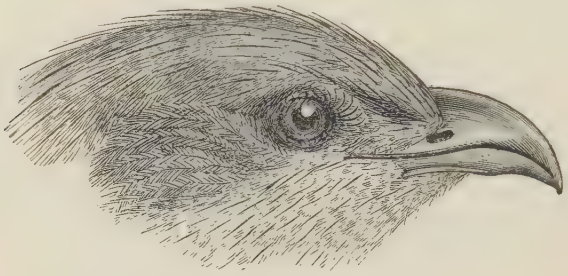

Fig. 29.—Head of *T. l. leschenaulti*. ½.

Nestlings have the feathers of the back, scapulars and wing-coverts edged with pale rufous; the feathers of the head are dully centred blackish and the chin, throat, breast, flanks and upper abdomen are boldly streaked with black.

Distribution. Roughly speaking, this form may be said to occupy the whole of India South of a line drawn from the Gulf of Cambay to the mouths of the Mahanadi.

Nidification. The nesting-habits of this bird are very like those of the genus *Rhopodytes*. It builds an open, shallow, saucer-shaped nest of leaves and twigs, plentifully lined with green leaves and placed at any height from four to twenty feet up in saplings, creepers on bigger trees or high bushes, generally selecting scrub-jungle, mixed with trees, for breeding purposes. The nest may be about ten or twelve inches across in external dimensions, as it is very roughly and untidily built but the hollow for the eggs is not more than half that. Vidal and Bourdillon both found eggs in early April and Miss Cockburn in March on the Nilgiris but Sparrow found them laying in July in the South Deccan, whilst Betham took eggs as late as the 7th August in Baroda. Two or three eggs are laid. The ten eggs I have seen average 33·9 × 26·1 mm.: maxima **35·0 × 27·0** and 33·0 × **27·2** mm.; minima **33·0** × 27·2 and 33·1 × **24·8** mm.

Habits. The Sirkeer Cuckoos frequent forest but prefer scrub-jungle, secondary growth and mixed bamboo- and scrub-jungle;

here they hunt about both on the ground and in the bushes and trees, feeding principally on insects, small grasshoppers, beetles, etc. but also consuming many berries, seeds and different kinds of fruits. They are poor fliers and will not take to flight unless forced to desert the piece of jungle they occupy but they are very expert in finding their way on foot through the thickest of jungle or thorniest of cane-brakes. They are silent birds having a short harsh cry when frightened and a low chuckling note when feeding, quite inaudible a few yards away. They are found in the plains where the country is at all broken and in the hills up to about 6,000 feet.

(1487) Taccocua leschenaulti sirkee.

THE PUNJAB SIRKEER.

Centropus sirkee Gray, Hardw. Ill. Ind. Zool., i., pl. 28 (April 1831) (Cawnpore).
Taccocua leschenaulti. Blanf. & Oates, iii, p. 237 (part).

Vernacular names. *Jangli Tota* (Hind.).

Description. This form differs from the last in being very much paler both above and below but varies little from it in extremes of measurements except in having a smaller bill.

Colours of soft parts as in the other races.

Measurements. Wing 145 to 169 mm.; culmen about 24 to 26 mm.

The average bird is much larger than the preceding.

Distribution. North-West Provinces, Punjab, Rajputana, Sind, Central Provinces, United Provinces North of the range of the last race.

Nidification exactly like that of the preceding bird but the eggs are much bigger. Average ten eggs 36·2 × 27·3 mm.: maxima 39·8 × 27·8 and 37·3 × 28·2 mm.; minima 34·6 × 26·1 mm.

Habits. Those of the genus.

(1488) Taccocua leschenaulti infuscata.

THE HILL SIRKEER CUCKOO.

Taccocua infuscata Blyth, J. A. S. B., xiv, p. 201 (1845) (Sub-Himalayas).*.
Taccocua leschenaulti. Blanf. & Oates, iii, p. 287 (part).

Vernacular names. *Jangli Tota* (Hind.).

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* It is very difficult to say whether Blyth meant the North-West or Eastern Himalayas. He describes his bird as pale and large, *i.e.* like the Western birds but then refers to the deep ferruginous abdomen and vent, a feature of the Eastern birds. As, however, in J. A. S. B., xv he again describes a Sirkeer under the name of *affinis* from Bengal in which he lays stress on the dark plumage, it must be presumed that the name *infuscata* refers to the Western form.

Description. This is the palest and largest of the four races accepted, a very dull-coloured bird but sometimes with a good deal of fulvous below.

Colours of soft parts as in the other races.

Measurements. Wing 153 to 186 mm., very few below 160 mm.; tail 250 to 265 mm.; tarsus about 39 to 40 mm.; culmen 25 to 28 mm.

Some of the smaller and darker of these individuals should perhaps be referred to the previous race and may be only wanderers from their normal breeding-range.

Distribution. The base of the Himalayas from the lower hills up to at least 7,000 feet from Mussoorie, Murree and Simla to Garhwal and Dehra Dun.

Nidification. Similar to that of the other races.

Habits. Those of the genus.

(1489) Taccocua leschenaulti affinis.

THE BENGAL SIRKEER CUCKOO.

Taccocua affinis Blyth, J. A. S. B., xv, p. 19 (1846) (Monghyr).
Taccocua leschenaulti. Blanf. & Oates, iii, p. 237 (part).

Vernacular names. *Jangli Tota* (Hind.).

Description. The darkest of all the races and especially so on the lower plumage, where it is also much more rufous.

Colours of soft parts as in the other races.

Measurements. Wing 151 to 164 mm.; tail 212 to 254 mm.; tarsus 38 to 39 mm.; culmen about 25 to 28 mm.

Distribution. Bengal, Bihar, Nepal, Sikkim, Bhutan Duars and extreme Western Assam. Birds from Orissa belong to this race and those from the submontane tracts North of the United Provinces are very dark and rufous and must also be placed with it. I obtained specimens in Cachar and also one in the grass-lands in Barpeta, North of the Brahmaputra in the Kamrup District.

Nidification. Similar to that of the other races. Twenty eggs average 34·8 × 26·5 mm.: maxima **37·3** × 27·0 and 36·1 × **28·1** mm.; minima **29·6** × **22·0** mm. The breeding months for this race seem to be April to July.

Habits. Those of the genus. This Sirkeer seems to be found both in the plains and in the hills up to about 8,000 feet but is rare above 5,000 feet and most common under 3,500 feet. It is extremely common in Bihar, where it occasionally comes into compounds and orchards.

Genus CENTROPUS.

Centropus Illiger, Prodr., p. 205 (1811).

Type, *Centropus senegalensis* Linn. Africa.

The genus *Centropus* is distinguished from all the other *Cuculidæ* by having a long, straight hind claw or hallux, very like that of a Lark; the other claws are slightly curved; the bill is deep, moderate in size and strongly curved; the nostrils are partly covered by a membrane; a row of bristles grow above the eye; the wing and tail are as in *Taccocua*; the feathers of the head, neck and breast are stiff and bristly; the tarsus is strong and also much longer than normal in this family.

Sexes alike.

This genus, one of undoubtedly primitive form, extends throughout the Ethiopian, Oriental and Australasian regions. Certain forms are said to be flightless, but all the Lark-heeled Cuckoos dislike flying unless pressed and the so-called flightless forms are probably only greater adepts at concealment and pedestrianism than the others.

Key to Species.

A. Under wing-coverts never chestnut.
  a. Head and body black.
    a'. Bill black ..... *C. sinensis*, p. 189.
    b'. Bill green or yellow ..... *C. chlororhynchus*, p. 193.
  b. Head and body brown or buff ..... *C. andamanensis*, p. 194.
B. Under wing-coverts chestnut ..... *C. bengalensis*, p. 194.

Centropus sinensis.

Key to Subspecies.

A. Interscapulars chestnut.
  a. Larger; wing, ♂ over 200, ♀ over 219 mm..... *C. s. sinensis*, p. 189.
  b. Smaller; wing ♂ under 200, ♀ under 219 mm. ..... *C. s. intermedius*, p. 192.
B. Interscapulars black ..... *C. s. parroti*, p. 192.

(1490) Centropus sinensis sinensis.

The Common Crow-Pheasant or Coucal.

Polophilus sinensis Stephen, Shaw's Gen. Zool., ix, p. 51 (1815) (Ningpo, China).
Centropus sinensis. Blanf. & Oates, iii, p. 239 (part).

Vernacular names. *Mahoka* (Hind.); *Kukca* (Beng.); *Dao-di-dai* (Cachari); *Kukoo-Sorai* (Assam).

Description. Whole plumage, except parts noted below, black; the head, neck and breast glossed with purple-blue, lessening and becoming greener on the breast, abdomen and flanks; tail less

deep a black with a bronze-green sheen and very faintly cross-rayed; wings, scapulars and interscapulars chestnut, the tips of the primaries and outer secondaries tipped with dusky.

Colours of soft parts. Iris crimson; bill, legs and feet black.

Measurements. Wing 205 to 232 mm. (one 195 mm., one 239 mm., one 242 mm.); tail 220 to 262 mm.; tarsus 58 to 66 mm.; culmen 33 to 37 mm.; in most cases females are larger than males.

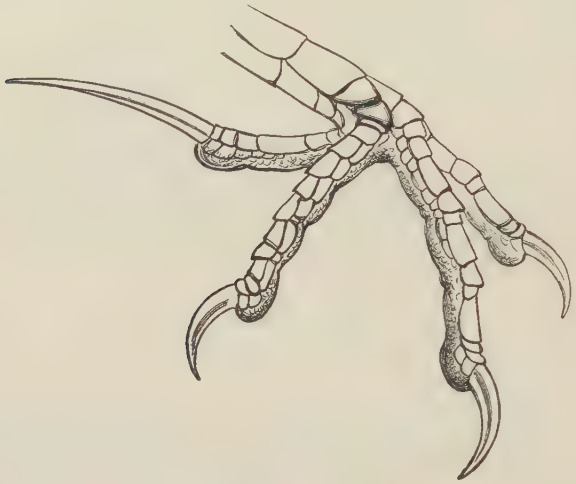

Fig. 30.—Foot of *C. c. sinensis*. ⅔.

Young birds. Upper plumage barred dark brown and rufous, the shafts pale and glistening; rump barred blackish-brown and dirty white or fulvous; tail black glossed with green and barred with dull grey or greyish-fulvous; below from chin to under tail-coverts dark brown narrowly barred with dull white. Individual variation is very great in young birds. I have seen nestlings acquiring their first plumage with the head and shoulders almost black, very lightly marked with rufous or rufescent-white, whilst the majority have these parts practically concolorous with the rest of the upper parts. I have also seen females, but never males, breeding in juvenile plumage. On the other hand, a nestling skin in the British Museum collection has the head and back conspicuously black, though it is sexed female, perhaps wrongly so.

Young birds have the iris grey, glaucous blue-grey or dull brown.

Distribution. Northern India, roughly from Sind and Kashmir through the North-West Provinces, Punjab and United Provinces; the sub-Himalayas as far East as Eastern Assam and South to the Ganges Valley in Bihar and Bengal. Birds from South of the Brahmaputra are small and appear to belong to the next race

with the exception of those from Manipur, which are very large and must be retained with this form.

The form obtained in South China seems inseparable from this large race.

Nidification. The Common Coucal breeds over the whole of its area after the rains have well started. A few birds breed in May in Bihar but very few commence laying until the end of June and most lay in July and August, eggs being laid until the end of September. The nest most often made is a roughly football-shaped affair of small twigs, leaves and grass, sometimes nearly all of the former, sometimes entirely of the latter but the lining is invariably of green leaves. Occasionally an open nest is made, a deep cup with well-raised sides. It may be placed in almost any kind of position from three to twenty feet from the ground, in bushes, trees, creepers, thick clumps of coarse grass, reeds or bamboos. The eggs number three or four and in texture are just like those of the rest of the family but whilst the normal shape of the eggs in other genera is a long oval or elliptical, that of the genus *Centropus* is often a very broad oval, sometimes even spheroidal. Fifty eggs average 35·9 × 28·0 mm.: maxima **38·9** × 29·6 and 35·8 × **29·9** mm.; minima **31·6** × 26·4 and 38·1 × **25·7** mm.

Both birds take part in incubation and the hen sits very close after the first few days but before incubation commences she is very shy and deserts both nest and eggs on very little provocation. Eggs are sometimes laid at considerable intervals, the young birds varying greatly in stages of growth.

Habits. The Common Coucal is found in the Himalayas up to about 7,000 feet, though not often over 5,000 feet, wherever there are suitable grass-lands, scrub-jungle or bush cover. It feeds quite as much on the ground as it does in the lower bushes and grass, amongst which it climbs with great ease and speed, twisting in and out of branches and brambles with extraordinarily little noise. Like all its relations it dislikes flying and even when driven across roads or open spaces it may often be seen running at good speed from one cover to another. When forced to fly, its progress is slow and laboured, with much flapping of wings and jerking of its tail; even when walking it has a habit of constantly spreading its tail like a huge fan and jerking it up and down. Its nuptial display is very comical; generally conducted on the ground, it consists of dancing and bowing with feathers wide fluffed out, expanded tail and drooping wings, the latter quivering and the former every now and then jerked back over the head. Its food includes grasshoppers, coleoptera and all kinds of insects, field-mice, lizards, other birds' eggs and, it is said, even their young. Its own flesh is considered a delicacy by Mahomedans and some castes of Hindus. Its note is a deep "hoo hoo hoo," slowly repeated—a sonorous sound, audible at a great distance; it also has a chuckling note not unlike that of *Rhopodytes* but deeper.

(1491) Centropus sinensis intermedius.

HUME'S CROW-PHEASANT.

Centrococcyx intermedius Hume, Str. Feath., i, p. 454 (1873) (Thayetmyo).
Centropus sinensis. Blanf. & Oates, iii, p. 239 (part).

Vernacular names. *Bote* (Burmese); *Dao-di-dai* (Cachari); *Kukoo-Sorai* (Assam); *Kuka* (Beng.).

Description. Only differs from the preceding form in its smaller size.

Colours of soft parts as in the Common Coucal.

Measurements. Wing 183 to 204 mm.; tail 215 to 265 mm.; tarsus about 56 to 60 mm.; culmen 30 to 34 mm. Males and females seem to measure practically the same, the latter being, if anything, larger on an average.

Distribution. Assam South of the Brahmaputra; Cachar, Sylhet, Tippera, Chittagong, Comilla, Burma, Northern Malay States, Siam and the Indo-Chinese countries, Yunnan and Hainan.

Nidification differs in no respect from that of the other races. The great majority of nests seen by myself have been of grass except for a lining of leaves. Fifty eggs average 35·7 × 28·6 mm.: maxima **39·1** × 30·0 and 37·4 × **30·4** mm.; minima **30·4** × 28·5 and 35·1 × **26·0** mm.

Habits. Those of the genus. This race even more than the others seems peculiarly addicted to grass-lands and is very common in the huge extents of long grass and reeds which run along the plains at the foot of the Himalayas in Assam.

(1492) Centropus sinensis parroti.

THE SOUTHERN CROW-PHEASANT.

Centropus sinensis parroti Stresemann, Nov. Zool., xx, p. 323 (1913) (Ceylon).
Centropus sinensis. Blanf. & Oates, iii, p. 239 (part).

Vernacular names. *Mahoka* (Hind.); *Jemudu Kaki* (Tel.); *Kalli-kaka* (Tam.); *Chempakam* (Tam., Ceylon); *Etti-kukula*, *Bu-kukula* (Cing.).

Description. Differs from either of the preceding races in having the interscapulars black instead of chestnut; the forehead and fore-crown are paler and brownish with little or no gloss the sheen of the head, back and underparts is more blue or even green-blue than rich purple-blue.

Colours of soft parts as in the other races.

Measurements. Wing 184 to 195 mm. (Ceylon and Malabar); 188 to 215 mm. (Bombay); tail 238 to 273 mm.; tarsus 48 to

53 mm.; culmen 33 to 36 mm. (Ceylon and Malabar); 36 to 39 mm. (North Bombay Presidency).

Distribution. Ceylon and India South of the range of the Common Crow-Pheasant. Some individuals in the North of the Bombay Presidency are intermediate in size and also show chestnut on the interscapulars.

Nidification. The Southern Crow-Pheasant breeds in Ceylon from March to September, laying from two to four eggs which are like those of the other races. Thirty average 36·2 × 26·3 mm.: maxima **40·3** × 30·1 and 39·2 × **30·8** mm.; minima **32·3** × **24·0** mm. The nest is made principally of twigs, mixed with roots, grass, etc. and with the usual lining of leaves. In the Nelliampathy Hills Kinloch took eggs in early March and Bourdillon says they continue to lay in Travancore up to the end of August.

Habits. Those of the species.

(1493) Centropus chlororhynchus.

THE CEYLON CROW-PHEASANT.

Centropus chlororhynchus Blyth, J. A. S. B., xviii, p. 805 (1849) (Ceylon); Blanf. & Oates, iii, p. 242.

Vernacular names. *Etti-kukula* (Cing.).

Description. Head, body and tail black glossed with purple, rather bluish on the head and changing to copper-bronze on the neck, upper back and breast; the sheen on the tail more blue and each feather obsoletely cross-rayed; scapulars, interscapulars and wings deep bay, the quills tipped dusky blackish.

Colours of soft parts. Iris deep red to crimson; bill apple-green, blackish at the base and about the nostril; legs and feet black.

Measurements. Wing 160 to 172 mm. (♂), 174 to 182 mm. (♀); tail 215 to 240 mm.; tarsus 45 to 47 mm.; culmen 38 to 44 mm.

Young are apparently very similar to the adult.

Distribution. The humid forests of the South-West hill region of Ceylon.

Nidification. Wait says that this Crow-Pheasant breeds from April to July but Jenkins took nests for me in Ratnapura district from January to March. The nests are described as just like those of *C. sinensis parroti* but are built in dense scrub-jungle in forest. The eggs vary from **34·0** × **25·9** mm. to **36·5** × 26·2 and 35·0 × **29·2** mm. Nine eggs average 34·7 × 27·9 mm.

Habits. This Cuckoo is confined to the wettest and most humid districts of Ceylon from the plains up to some 2,500 feet, where it is not uncommon. Wait records that it is an inhabitant of deep jungle where the undergrowth is thick and tangled. The call is a sonorous "poo-whoop-whoop" uttered in the morning and evening or after rain. It seldom emerges into the open.

(1494) Centropus andamanensis.

THE ANDAMAN CROW-PHEASANT.

Centropus andamanensis Tytler, Beavan, Ibis, 1867, p. 321 (Andamans); Blanf. & Oates, iii, p. 242.

Vernacular names. None recorded.

Description. Whole head and body pale greyish ochre-brown, darker and more brown on the lower back, rump, vent and under tail-coverts; tail darker brown towards the tip and conspicuously black-shafted; scapulars, interscapulars and wings rich deep chestnut-bay, the tips of the quills more dusky brown.

Colours of soft parts. Iris crimson; bill, legs and feet black.

Measurements. Wing 173 to 195 mm.; tail 235 to 242 mm.; tarsus 52 to 56 mm.; culmen 29 to 35 mm.; the sexes are much the same in size.

Young birds are barred below from chin to vent with pale brown and pale dusky ochre; there are also traces of barring on the head, neck and upper back, which are probably barred throughout in nestlings.

Distribution. Andamans and Cocos Islands only.

Nidification. Many nests with eggs were found by Osmaston and others by Wickham and Anderson in the months of February to the end of July; all were built in small trees and bushes, well covered with foliage at heights between eight and twenty feet from the ground. The eggs number two or three, once four, and thirty of them average 34·7 × 28·0 mm.: maxima **37·1** × 29·1 and 35·9 × **29·9** mm.; minima **32·3** × 28·0 and 34·8 × **26·0** mm.

Habits. Those of the genus but this seems to be more exclusively a forest bird than *Centropus sinensis*, though it comes out frequently into grass-land and even enters the gardens round Port Blair, where it is very common.

(1495) Centropus bengalensis bengalensis.

THE LESSER COUCAL or CROW-PHEASANT.

Cuculus bengalensis Gmelin, Syst. Nat., iii, p. 412 (1788) (Bengal).
Centropus bengalensis. Blanf. & Oates, iii, p. 243.

Vernacular names. *Nyong* (Lepcha); *Kyok-Kyok* (Bhut.); *Ulukukuha* (Assam).

Description. Head, neck, upper back and lower plumage black with a deep blue gloss and glistening black shafts; tail black glossed with green, tipped narrowly with white or rufous and faintly cross-rayed; lower back and upper tail-coverts less deep on back, the latter only glossed with blue; scapulars, interscapulars and wings chestnut, the tops of the quills and the innermost secondaries darker and browner, showing up the lighter chestnut shafts.

Colours of soft parts. Iris crimson; bill black; legs and feet slaty-black to black.

Measurements. Wing, 137 to 174 mm.; tail, 156 to 211 mm.; tarsus, 36 to 47 mm.; culmen, 22 to 26 mm.

Young birds. Head, neck, upper back, scapulars and inner wing-coverts dark brown, each feather with white shafts edged with rufous; rump and upper tail-coverts barred fulvous and black; tail blackish, more broadly tipped with rufous and barred with dull rufous-grey, the bars obsolete on the outer feathers; below rufous-white or fulvous-white, darkest on the breast and flanks, the shafts pale and glistening and the flanks barred with dark brown.

The female retains this plumage longer than the male and breeds whilst in it.

Nestlings in first feathered plumage are chestnut-rufous above, streaked with black on the head and neck; barred with black on back, wings and tail; below, the plumage is the same as in the last stage but the throat and fore-neck are profusely spotted and the flanks more broadly and boldly barred.

In the nestling stage the upper tail-coverts reach to the end of the tail and in the full-grown but non-adult bird they reach to within about 30 to 35 mm. of it.

Iris yellow or pale dull brown; bill horny-yellow, darker on the culmen; legs and feet plumbeous or greenish-slate.

Plumage more or less intermediate between the three stages is constantly met with.

Distribution. The South-West coast of India from Travancore to Kanara; Wynaad, Mysore, Orissa, Bengal, Bihar, Assam, Burma South to Tenasserim, Siam, Indo-Burmese countries, Hainan, Yunnan and South-West China to Formosa. It also occurs, though not commonly, in the Malay States.

Nidification. The Lesser Crow-Pheasant breeds from May to September but most frequently in July and early August. It makes a nest much like that of the larger Coucals but seldom uses twigs in its construction and very often incorporates the living grass-blades in the base, roof or sides of the structure. It is placed either in clumps of grass or in low bushes in grass-lands, scrub or secondary growth. I have never seen green leaves used for the lining. The eggs number three to five and are small replicas of those of the larger *Centropi*. Fifty average 28·2 × 23·8 mm.: maxima **34·1** × 24·3 and 28·6 × **25·3** mm.; minima **25·0** × 22·0 and 27·7 × **21·9** mm.

Although the eggs are very chalky in texture the surface is very smooth and often highly polished.

Habits. This Cuckoo is found throughout the plains and also as high as 5,000 feet in the hills, though more commonly below 3,000 feet. It keeps much to grass-lands but is also found in scrub-jungle, secondary growth or any of these intermixed. Its voice, flight and diet are those of the genus.

Suborder **PSITTACI.**

The present Suborder, as Blanford explained, is, perhaps, better entitled to a higher rank, that is an Order, than most of the zygodactylous groups On the whole, however, it seems to be too closely connected with the various Suborders to warrant its being cut apart. The great differences from the other groups lie in the opisthocœlous dorsal vertebræ and in the upper mandible being loosely articulated with the skull as if working on a hinge. The bill itself is short, strong and deeply hooked with a deep fleshy core at the base as in the Owls; the tongue is thick and fleshy and armed with a horny spatulate tip; the sharp terminal hook of the beak is furnished with peculiar file-like corrugations or striations, the form of which varies in different genera. The palate is desmognathous, the palatines enormously developed to form laterally-compressed descending plates; the basi-pterygoid processes are wanting.

The femoro-caudal, semitendinosus and accessory semitendinosus muscles are present but there is no accessory femoro-caudal and the ambiens muscle is sometimes present, sometimes absent. The furcula is weak and sometimes incomplete in non-Indian genera; the deep plantar tendons are *Galline* as in the Cuckoos, but it is interesting to note that it has been shown * in at least one instance, *i. e.* in a nestling of *Calopsittacus novæ-hollandæ*, the fourth toe was not directed backwards, that is to say that at this stage the foot was not zygodactylous. There are no cæca and the gall-bladder is generally wanting.

The feathers are furnished with an aftershaft; the spinal feather-tract is well defined on the neck, forking on the upper back; the oil-gland is usually present and tufted, though it is absent in a few genera. There are twelve tail-feathers in all the Indian genera; the wings are rather pointed and there are ten primaries.

The young are hatched naked and the feathers remain in the sheaths until the birds are nearly full-grown.

Family PSITTACIDÆ.

Characters of the family the same as those of the Suborder.

Key to Genera.

A. Tail much longer than the wing, rectrices graduated ..... PSITTACULA, p. 197.
B. Tail shorter than wing.
a. Bill swollen at sides, deeper than long .... PSITTINUS. p. 215.
b. Bill compressed, longer than deep ..... CORYLLIS, p. 216.

* Pycraft, 'Avicultural Magazine,' vol. v, p. 300 (1907).

Genus **PSITTACULA.***

Psittacula Cuvier, Leçons d'Anat. Comp., vol. i (1800).

Type, *Psittacus alexandri* Linn.

In this genus the tail is very long and graduated with the central tail-feathers attenuated and much longer than the next pair; the bill is deeper than long; the upper mandible swollen at the sides, the culmen convex and greatly curved; the lower mandible short.

Nine species occur in the Indian Empire and the genus extends from Afghanistan to China, the Malay Archipelago and Australia.

Key to Species.

A. Head, except chin and mandibular streak in males, and body green; bill deep red.	
a. A large red patch on wing-coverts	*P. eupatria*, p. 197.
b. No red patch on wing-coverts	*P. krameri*, p. 201.
B. Head not wholly green.	
c. Head red in male, slaty in female	*P. cyanocephala*, p. 204.
d. Head dark slaty in both sexes	*P. schisticeps*, p. 206.
C. Crown and upper back grey; breast green.	
e. An emerald-green collar	*P. calthropæ*, p. 209.
f. No collar	*P. caniceps*, p. 212.
D. Crown and upper back grey; breast grey or greenish-grey	*P. columboides*, p. 208.
E. Crown and nape pinkish or bluish-grey; breast red	*P. alexandri*, p. 210.
F. Crown and nape green; sides of head and ear-coverts brick-red	*P. erythrogenys*, p. 213.

Psittacula eupatria.

Key to Subspecies.

A. Bill in male 39 mm. or under; generally under 37 mm.	
a. Moustachial streak narrow.	
a'. Tarsus slate-colour	*P. e. eupatria*, p. 198.
b'. Tarsus yellowish	*P. e. indoburmanica*, p. 200.
b. Moustachial streak very broad	*P. e. nepalensis*, p. 199.
B. Bill in male 39 mm. or over; generally over 40 mm.	*P. e. magnirostris*, p. 201.

* Mathews, 'Birds of Australia,' vol. vi, p. 169, shows that *Palæornis* cannot be used for our Indian Paroquets.

(1496) Psittacula eupatria eupatria.

THE LARGE CEYLONESE PAROQUET.

Psittacus eupatria Linn. Syst. Nat., 12th ed., i, p. 140 (1766) (Ceylon).
Palæornis eupatria. Blanf. & Oates, iii, p. 247.

Vernacular names. *Labu girawa* (Cing.).

Description.—Male. Traces of a black line from base of upper mandible to eye, often obsolete; a black stripe from the gape passing down the base of the lower mandible and then running back down the sides of the throat and again running up the sides of the neck, where it meets the bright rose-pink collar of the hind-neck; rest of head and neck grass-green, duller on the sides of the neck and often becoming bluish on the neck next the rose collar; remainder of upper parts grass-green, more yellow and bright on the rump and upper tail-coverts; central tail-feathers green at the base, changing to blue on the centre and again to yellow on the tips; lateral feathers green on the outer webs, yellow at the tips and on the inner webs; wings darker grass-green, the primaries dark at the tips and blackish on the inner webs, the green increasing in extent and leaving only a dark edge on the outer secondary; a patch of maroon-red on the coverts next the scapulars; throat and breast dull pale green, brightening to grass-green on the abdomen, vent and flanks; lesser under wing-coverts green, greater black; axillaries grass-green; under aspect of tail dark rich yellow.

Colours of soft parts. Iris pale blue speckled with yellow, pale yellow, or yellow with a blue outer ring; bill deep red; feet plumbeous or greenish-slate.

Measurements. Wing, ♂ 182 to 218 mm., ♀ 175 to 195 mm.; tail 195 to 303 mm.; tarsus about 16 to 17 mm.; culmen, ♂ 32 to 34 mm., ♀ 30 to 32 mm.

Females and **Young birds** have no rose collar or black moustachial stripe.

Distribution. Ceylon; possibly the Paroquets seen by Jerdon in the Carnatic were of this species and race. Those seen in Mysore by Taylor and in Malabar by Jerdon were almost certainly so, as they have since been obtained by Stewart in Travancore.

Nidification. According to Wait these Paroquets breed in Ceylon from November to March, laying their eggs in natural hollows in trees, selecting generally those on the outskirts rather than the interior of forests. When the holes are not large enough they enlarge them themselves until suitable in depth and size. They lay two to four eggs, which only differ from other eggs of the genus in size. All Paroquets lay white eggs with a fine soft texture and finish and, when fresh, with a very slight gloss; the shell is thin for the size of the egg and rather brittle. Most eggs are broad ovals in shape, the smaller end as a rule but very little

pointed. Wait gives the average size of the eggs of this bird as 30·5 × 24·1 mm.

In Travancore and the South of the Bombay Presidency they have been found breeding in January and February.

Habits. This fine Paroquet is found throughout Ceylon in suitable localities from the plains to about 3,500 feet, though more common below 1,000 feet than above this height. It collects in flocks of considerable size, frequenting both forest, well-wooded open country and also cultivated lands and even gardens, wherever indeed there are sufficient inducements in the way of fruit and berries for its food. It is very partial to Coconut-groves, often resting in them in immense numbers, flocks collecting together in the evening from a great distance. The din at such times, as well as in the morning, when the smaller flocks disperse to their feeding-grounds, is very great; all the members of each small flock as it arrives or leaves not only constantly utter loud cries themselves but it seems the duty of all the others to join in for the moment and, as the flocks rapidly follow one another, the cries are incessant. The voice of this Paroquet is very deep and powerful but rather less shrill and unpleasant than that of its smaller cousins. It feeds greedily on ripe and semi-ripe grain and, on this account, is often a nuisance to the cultivator.

(1497) Psittacula eupatria nepalensis.

THE LARGE INDIAN PAROQUET.

Palæornis nepalensis Hodgs., As. Res., xix, p. 177 (1836) (Nepal); Blanf. & Oates, iii, p. 248.

Vernacular names. *Chandana* (Beng.); *Chanda-ban-i* (Hind., Mussoorie); *Karan-suga*, *Kararia* (Nepal); *Ne-tso* (Lepcha); *Rai-tota* (Hind.); *Pedda-chilluka* (Tel.); *Peria-killi* (Tam.).

Description. Coloration of both sexes the same as that of *P. e. eupatria* but generally rather brighter and with a very broad, conspicuous moustachial streak; the occiput, cheeks and nape also are often more washed with blue.

Colours of soft parts. Iris yellow-white, yellow or yellow and blue in two rings; bill red; legs and feet "dirty flesh-colour or yellowish in the Himalayan birds" (*Hodgson*).

Measurements. Wing, ♂ 205 to 230 mm., ♀ 194 to 215 mm.; culmen, ♂ 35 to 39 mm., ♀ 33 to 35 mm.

Distribution. Northern and Central India from the Lower Himalayas to Kanara on the South-West; Raipur and Sambalpur in the Central Provinces. East it wanders as far as Western Bengal and is said to have been obtained in Calcutta.

Nidification. This fine Paroquet breeds during January and February, a few birds laying in December and others as late as early April. They lay either in natural hollows, which they

sometimes enlarge for their own convenience, or they make a nesting hollow for themselves, usually, but by no means invariably, selecting soft-wood trees for the purpose. They often make or select holes at immense heights from the ground and seldom use any that are under twenty feet from it. The eggs take nineteen to twenty-one days to hatch and both parents take part in the incubation, sitting very close and not hesitating to attack any hand that is incautiously brought too near.

There or four eggs are laid and fifty average 35·2 × 28·7 mm.: maxima **39·6** × 28·9 and 35·7 × **30·3** mm.; minima **32·2** × 28·4 and 34·9 × **27·3** mm.

Habits. Those of the species. They are much sought after by the Indians as cage-birds and are easily tamed and can be taught to utter a few words but they are not good talkers.

(1498) Psittacula eupatria indoburmanica.

THE LARGE BURMESE PAROQUET.

Palæornis indoburmanicus Hume, Str. Feath., vii, p. 459 (1878) (Sikkim); Blanf. & Oates, iii, p. 248.

Vernacular names. *Kyet-tau*, *Kyet-tu-yuay*, *Kyay-hpounkah* (Burma).

Description. Distinguished from *P. e. eupatria* by its generally brighter colour and by having less blue on the nape and sides of the head; the throat is much more yellow and the tarsus is yellowish instead of slate-colour. From *nepalensis* it can be separated by its less deep bill, more yellow throat, by having much less blue on the head and a narrower mandibular stripe.

Colours of soft parts as in the Indian Paroquet.

Measurements. Wing, ♂ 191 to 228 mm., ♀ 185 to 213 mm.; culmen, ♂ 33 to 39 mm., ♀ 29 to 35 mm.

Distribution. Sikkim to Eastern Assam; Dacca, Mymensingh, Comilla, Tippera and Chittagong in Eastern Bengal; probably the Sunderbands; all Burma South to Amherst; Siam, Annam and Cambodia.

The variation in colour in all these races is considerable. The rose-coloured wing varies from almost scarlet-pink to deep crimson-pink in individuals from the same locality; the blue on the nape next the rose-ring also varies considerably, whilst the red shoulder-patch varies much in size though little in colour. There are fortunately very fine series of this Paroquet in the Natural History Museum and these enable me to satisfy myself that Kloss's *P. e. avensis* and *P. e. siamensis* cannot be maintained.

Nidification. Similar to that of the preceding bird. In Assam and Northern Burma they breed principally from January to March and in Southern Burma from December to February. They lay three or four eggs, eighteen of which average 33·8 × 27·5 mm.: maxima **35·3** × **29·8** mm.; minima **32·3** × **25·0** mm.

Habits. This Paroquet is extraordinarily numerous in Assam and in Kamrup I have seen flocks which must have numbered hundreds of thousands crossing in the evenings from the South to the North bank of the Brahmaputra, though I could never ascertain where these roosted. They occasionally do include damage to ripening crops, for a flock will strip bare a field of rice, millet or maize in an incredibly short time. They fly at an immense height in long narrow ribbons, stretching for a great distance on either side, though of no great depth and so closely are the birds packed that a shot into the "brown" resulted once in forty birds being actually picked up. Their sonorous, but harsh, cries can be heard very far away and it is this sound which generally first heralds their approach.

(1499) Psittacula eupatria magnirostris.

THE LARGE ANDAMAN PAROQUET.

Palæornis magnirostris Ball, J. A. S. B., xli, 2, p. 278 (1873) (Andamans); Blanf. & Oates, iii, p. 249.

Vernacular names. None recorded.

Description. Distinguishable from all the other races by its much larger bill. As a rule the red patch on the wings is a brighter red and the blue above the rose collar is well developed.

Colours of soft parts as in the Large Burmese Paroquet.

Measurements. Wing, ♂ 205 to 217 mm., ♀ 190 to 209 mm.; culmen, ♂ 39 to 45 mm., ♀ 34 to 39 mm.

Distribution. Andaman Islands. Birds from the Cocos Islands have generally been retained under this name but they are very small with very small bills. There are, however, only three specimens in the British Museum Collection, two of which are young, so more material is badly required.

Nidification. Nests of this bird taken by Messrs. Osmaston and Wickham were generally in holes at an immense height from the ground, 50 to 150 feet, up in trees, sometimes branchless for the first 100 feet or so. Ten eggs average 35·1×28·2 mm.: maxima **36·1×28·3** and 24·1×**29·0** mm.; minima **34·0**×27·1 and 36·1×**26·3** mm.

Habits. Those of the species.

Psittacula krameri.

Psittacus krameri Scop., Annus I. Hist. Nat., p. 31 (1769).

Type-locality: West Africa.

Neumann has shown (Orn. Monatsb., xxiii, p. 178, 1915) that our Indian bird, so long known as *torquatus*, is really a subspecies of the African bird *krameri* and again that it cannot bear the name *torquatus*, which applies to a South American form.

Key to Subspecies.

A. Under mandible black ..... *P. k. manillensis*, p. 202.
B. Under mandible red ..... *P. k. borealis*, p. 204.

(1500) Psittacula krameri manillensis.

THE ROSE-RINGED PAROQUET.

Palæornis manillensis Bechst., Stubenvög., p. 612 (1794) (Ceylon, *Neumann*).
Palæornis torquatus. Blanf. & Oates, iii, p. 250 (part).

Vernacular names. *Tota*, *Lybar tota* (Hind.); *Gallar* (in N.W.P.); *Ragu* (Mahr.); *Chilluka* (Tel.); *Killi* (Tam.); *Rana girawa* (Cing.); *Chatun* (Sind).

Fig. 31.—Head of *P. k. manillensis*. ½.

Description.—**Male.** Head bright green, changing to pale blue on the sides of the neck, above and behind the ear-coverts; a narrow line of black bordering the base of the bill and running back to the eye; chin and throat black, running back and up the sides of the neck, where it meets a narrow rose-coloured collar; upper parts bright grass-green, bluish next the rose collar and very bright on the rump and upper tail-coverts; central tail-feathers greenish-blue, more green at the base and narrowly tipped with yellow; lateral tail-feathers more and more green towards the outermost; wings green, the lesser and median coverts faintly washed blue, the greater coverts and quills much darker green, the outer primaries narrowly edged with yellowish and the inner webs and tips blackish; lower plumage a paler, more grey-green colour, than the back; the vent, thigh-coverts, under wing-coverts and axillaries yellowish.

Colours of soft parts. Iris pale yellow; upper mandible coral-red, lower mandible nearly black, generally paler at the tip and tinged with red on the gonys in a few cases; legs and feet ashy-slate to greenish-slate.

Measurements. Wing, ♂ 156 to 171 mm., ♀ 151 to 161 mm.; tail, ♂ 216 to 224 mm., ♀ 181 to 194 mm.; tarsus 16 to 17 mm.; culmen 23 to 25 mm.

Female has no black on the chin, throat and head and no rose-colour.

Young birds are like the female but have the head a duller green. The rose-coloured ring and black are acquired in the spring of the third year.

Distribution. Ceylon; South India to Orissa, Western Bengal, Punjab, North-West Provinces and the base of the Himalayas to Bihar.

Nidification. The Rose-ringed Paroquet breeds over the whole of its area in February and March, a few pairs as early as February and a few others as late as April. The eggs are laid in hollows in trees either natural or cut out by the birds themselves, in the latter case the entrance being a fairly neat circular hole about two inches or rather more in diameter. Occasionally deserted nests of Woodpeckers and Barbets are used. The hole selected may be at any height from the ground and a very favourite site is a hollow in a Mango-tree in a grove, though, provided the hollow is satisfactory, a tree anywhere in garden, field or open country will be made use of. It also quite commonly breeds in holes in old walls and buildings. The eggs number four to six and are of the usual type. One hundred eggs average 30·5 × 24·3 mm.: maxima **34·1** × 25·0 and 31·3 × **25·7** mm.; minima **28·0** × 23·0 and 28·7 × **22·9** mm.

Habits. This is the most widely-spread and best known of all our Indian Paroquets, being common in all open, well-wooded country round about towns, villages and cultivation. Its rapid, graceful flight and loud screaming cries are known to everyone and it is a bold bird which so far from shunning observation seems to court it. It has a habit, like so many Paroquets, of collecting in vast numbers at certain favourite roosting-places, sometimes in company with Crows, Mynas and other birds and the noise in the mornings and evenings at such places is very great. Hutton describes the courting habits of this Paroquet and his description would apply equally well to any other species. He says: "The female of this species becomes the most affected of creatures, twisting herself into all sorts of ridiculous positions . . . uttering a low twittering note the while . . . her wings half spread and her head rolling from side to side." He applies this description to the female only but both sexes employ the same demonstrations, the male more often than the female. They are entirely grain- and fruit-eaters, often doing immense damage to crops and they are certainly birds which do not need any protection.

(1501) Psittacula krameri borealis.

THE EASTERN ROSE-RINGED PAROQUET.

Psittacula krameri borealis Neumann, Orn. Monatsb., xxiii, p. 178 (Assam) (1915).
Palæornis torquatus. Blanf. & Oates, iii, p. 250 (part).

Vernacular names. *Tiya*, *Tiya tota* (Beng.); *Tota-sorai* (Assam); *Daobator* (Cachari); *Kyay-gyot* (Burma).

Description. Similar to the preceding bird but with both mandibles wholly red.

Colours of soft parts. Iris yellowish-white; bill wholly coral-red; legs and feet greenish-slate.

Measurements. Wing, ♂ 164 to 183 mm., ♀ 162 to 170 mm.; tail, ♂ 240 to 282 mm., ♀ 190 to 240 mm.; tarsus 16 to 17 mm.; culmen 24 to 26 mm.

Distribution. Sikkim to the extreme East and South of Assam; Eastern Bengal; Northern and Southern Burma, South to Pegu; Shan States.

Nidification. Differs in no way from that of the preceding bird. Cripps say that in Dibrugarh he found them breeding in June but we found that all the eggs were laid in January and early March as in Burma and elsewhere, many eggs being laid in January. I have too few measurements of eggs to be of any use.

Habits. Those of the preceding race but it does not seem to be nearly so common a bird or ever to assemble in such enormous flocks.

Psittacula cyanocephala.

Key to Subspecies.

A. Under wing-coverts and rump bluish-green ..... *P. c. cyanocephala*, p. 204.
B. Under wing-coverts and rump green, not bluish ..... *P. c. bengalensis*, p. 206.

(1502) Psittacula cyanocephala cyanocephala.

THE WESTERN BLOSSOM-HEADED PAROQUET.

Psittacus cyanocephalus Linn., Syst. Nat., 12th ed. i, p. 140 (1766) (India).
Palæornis cyanocephalus. Blanf. & Oates, iii, p. 251.

Vernacular names. *Tuia Tota* (Hind. in S. India); *Tui-suga* (Nepal); *Kir* (Mahr.); *Rama chilluka* (Tel.); *Batu-girawa*, *Malitchia* (Cing.); *Killi* (Tam. Ceylon).

Description.—Adult male. Head above and on the sides deep red with a plum-like bloom of blue on the lower cheeks, posterior crown and nape; feathers at base of lower mandible, chin, throat and a broad line below the cheeks black, prolonged up the sides and back of the neck as a narrow collar; hind-neck verdigris-green, back and scapulars yellowish-green passing into blue on the rump and upper tail-coverts; central tail-feathers blue, rather greenish at the base and with broad white tips; wings green, most of the quills and greater coverts pale-edged; a patch of maroon-red on the median coverts and a dash of blue on these and the lesser coverts; lower plumage bright greenish-yellow, the under wing-coverts and axillaries pale blue.

Colours of soft parts. Iris white to pale lemon-yellow; upper mandible orange-yellow to orange, lower mandible almost black; legs and feet dull green.

Measurements. Wing, ♂ 136 to 146 mm., ♀ 133 to 141 mm.; tail, ♂ 208 to 240 mm., ♀ 155 to 192 mm.; tarsus 12 to 13 mm.; culmen, ♂ 18 to 19 mm., ♀ 17 to 18 mm.

Female. Head plum-blue, greyer on the forehead and sides, surrounded with a bright yellow collar; no black on chin, throat or collar and no verdigris-green on hind-neck; the maroon wing-spot is absent or obsolete.

Young birds are all green. The bill is wholly pale yellow.

Distribution. Ceylon and all well-wooded India to the foot-hills of the Himalayas and to a height of some 6,000 or 7,000 feet. East to Western Bengal, Bihar, Sikkim and the Bhutan Dooars.

Nidification. In Ceylon this little Paroquet breeds from February to May and in Southern India principally from February to early April. In the Lower Himalayas they breed in April and May and finally in Bihar from February up to early May. This Paroquet generally excavates a nest-hole for itself, selecting a rotten branch for this purpose; often several birds breed close together and sometimes in regular colonies. The eggs number four to five, rarely six, and fifty average 24·9 × 20·2 mm.: maxima **26·0** × 20·2 and 25·4 × **21·1** mm.; minima **22·2** × 19·7 and 23·8 × **19·4** mm.

Habits. Those of the genus but it is said to move about locally in the different seasons. Aitken records it as being very common in Berar in June after the rainy season commences but as leaving that district to breed in the adjoining hills. Its flight is extremely swift and direct and its voice softer than any of the preceding species. It is sometimes found frequenting forest but prefers open but well-wooded country and is common also in cultivated tracts

(1503) Psittacula cyanocephala bengalensis.

THE EASTERN BLOSSOM-HEADED PAROQUET.

Psittacus bengalensis Forst. Ind. Zool., p. 40 (Bengal) (1781).
Palæornis rosa. Blanf. & Oates, iii, p. 252.

Vernacular names. *Faraida* (Beng.); *Dao-bator kashiba* (Cachari); *Kyay-ta-ma* (Burma).

Description. Similar to the preceding bird but with a much paler head in the male; the tail is a much paler blue and the rump, upper tail-coverts, under wing-coverts and axillaries are green, not blue.

Colours of soft parts as in the Indian Blossom-headed Paroquet.

Measurements. As in the preceding bird but with a much shorter tail; ♂ 149 to 158 mm., ♀ 145 to 156 mm.

Distribution. Bengal, Nepal and Sikkim to Eastern Assam; Burma South to Tenasserim and East to Yunnan, Shan States, the Indo-Chinese countries and South China.

Nidification. Similar to that of the preceding race but sometimes breeds in thin evergreen forest and I also once found a very large colony breeding in January in the walls of an old temple near Tarkeswar. Forty eggs average 25·0×20·4 mm.: maxima 28·5×22·0 mm.; minima 22·0×19·1 mm.

They breed from January to March, a few birds laying as late as April.

Habits. Similar to those of the Western Blossom-headed Paroquet.

Psittacula schisticeps.

Key to Subspecies.

A. Tail-feathers all broadly tipped with bright pale yellow ..... *P. s. schisticeps*, p. 206.
B. Central tail-feathers dull pinkish-yellow on terminal halves ..... *P. s. finschi*, p. 208.

(1504) Psittacula schisticeps schisticeps.

THE HIMALAYAN SLATY-HEADED PAROQUET.

Palæornis schisticeps Hodgs., As. Res., xix, p. 178 (1836) (Nepal); Blanf. & Oates, iii, p. 253.

Vernacular names. *Pahari tuiya* (Hind. Mussoorie); *Madana Suga* (Nepal); *Gagi* (Calcutta dealers).

Description.—Adult male. Whole head dark slaty except feathers next the lower mandible, chin, throat and a broad line below the cheeks, narrowing behind the ear-coverts, black;

a narrow collar of bright verdigris-green on the sides and back of neck; upper parts dark grass-green, a little brighter on the scapulars, rump and upper tail-coverts; middle tail-feathers greenish at the base, blue for about one-third their length and bright yellow on the terminal third; lateral rectrices duller yellow, the outer webs green except at the tips; under aspect of tail bright yellow; wings like the back, the quills edged with pale yellowish and the median coverts with a patch of blackish-red; under plumage bright pale green, the tail-coverts and vent more yellow; the axillaries and under wing-coverts tinged with blue.

Colours of soft parts. Iris very pale lemon-yellow to deep yellow; upper mandible coral-red at the base, then orange-yellow, the tip and whole lower mandible yellowish; legs dull green or slaty-green.

Measurements. Wing, ♂ 162 to 174 mm., ♀ 154 to 161 mm.; tail, ♂ 205 to 246 mm., ♀ 150 to 161 mm.; tarsus 12 to 13 mm.; culmen 20 to 22 mm.

Female. Similar to the male but with no red wing-patch.

Young birds are green throughout but apparently assume the dark head within the year.

Distribution. Himalayas from Kashmir, Kuman and Garhwal to Western Assam in Kamrup.

Nidification. The Slaty-headed Paroquet breeds up to 7,000 feet or a little higher throughout its range. We found it feeding right out in the plains of Kamrup in May but they were probably breeding in the hills about thirty miles away. They are said to generally select lofty trees in forests and to use either natural hollows or to cut these out for themselves at great heights from the ground. They lay four or five eggs, generally in early April, a few in early May and others in the end of March. They are of course white and of the usual round shape and texture. Thirty eggs average 28·3 × 22·2 mm.: maxima **30·2** × 22·3 and 27·9 × **24·0** mm.; minima **27·1** × 22·0 and 27·3 × **21·2** mm.

Habits. In Summer this little Paroquet is found up to 8,000 feet but in Winter it seems to keep principally to the lower ranges between 2,000 and 4,000 feet. During the latter season it collects in small flocks, numbering anything from half-a-dozen to fifty birds and may be seen in gardens and round villages, though in the breeding-season it keeps almost entirely to forests. It is said often to associate with flocks of other Paroquets, such as the Blossom-headed or Rose-ringed. It never assembles in flocks large enough to do damage to fruit or grain and probably feeds principally on wild figs of various kinds, seeds and berries.

(1505) Psittacula schisticeps finschi.

THE BURMESE SLATY-HEADED PAROQUET.

Palæornis finschi Hume, Str. Feath., ii, p. 509 (1874) (Kollidoo); Blanf. & Oates, iii, p. 254.

Vernacular names. *Dao-bator ko-gashim* (Cachari).

Description. Sex for sex just like the preceding bird but paler throughout; the head a paler slate; the back more yellow; the central tail-feathers a paler lilac-blue in the middle and duller lilac-yellow on the terminal halves; under wing-coverts and axillaries a *darker* blue-green.

Colours of soft parts. Iris creamy-white to yellow; upper mandible coral-red or vermilion, tipped yellow, the lower mandible all yellow; legs and feet dirty green.

Measurements. Wing 146 to 150 mm.; tail 231 to 299 mm.; the central tail-feathers are much narrower than those of *P. s. schisticeps* as well as much longer.

Distribution. East and South Assam; Burma South to Tenasserim.

Nidification. Similar to that of the preceding bird but keeping less exclusively to deep forest and usually selecting rather small trees in which to excavate its nesting-holes at between 15 and 25 feet from the ground. Several birds often nest within a very small area. They lay four to five eggs, thirty of which average 27·1 × 21·5 mm.: maxima **29·8 × 23·5** mm.; minima **24·4** × 21·9 and 28·0 × **20·8** mm.

Habits. Those of *P. s. schisticeps*, but I have never seen it in compounds and about villages. The note is very soft for that of a Paroquet.

(1506) Psittacula columboides.

THE BLUE-WINGED PAROQUET.

Palæornis columboides Vigors, Zool. Journ., v. p. 274 (1835) (Aneichardi, Travancore); Blanf. & Oates, iii, p. 255.

Vernacular names. *Madangour tota* (Hind.).

Description.—Male. Lores, cheeks and feathers round the eye bright green merging into violet-blue at the edges and on the forehead; sides of throat, running up round the neck as a narrow collar, black; a brilliant blue-green collar next the black one widening on the throat and fore-neck; remainder of head, neck, upper back and breast dove-grey with a beautiful lilac-blue sheen on the head; lower back, rump and upper tail-coverts greenish-blue; central tail-feathers blue, tipped with yellowish; lateral feathers green on the outer, dull yellow on the inner webs; the pair next the central rectrices bluish on the outer, green on the inner webs; wing-coverts dark green with narrow pale edges; primaries black

with blue edges, the blue increasing in extent and covering nearly the whole of both webs on the innermost; secondaries like the coverts; abdomen dove-grey changing to green on the vent and thigh-coverts; under tail-coverts pale blue-green; axillaries and under wing-coverts greenish-blue.

Colours of soft parts. Iris creamy-yellow; upper mandible coral-red tipped yellowish, lower mandible black; in the female and young the whole bill is blackish; legs and feet dull grey or plumbeous green.

Measurements. Wing 131 to 143 mm.; tail 230 to 248 mm.; tarsus 13 to 14 mm.; culmen 21 to 25 mm.; females average a good deal smaller than males and the tails never exceed 200 mm.

Female has no green collar, very little green round the eye and none on the forehead; the upper back is dull green and the lower parts from the breast greenish changing to bright yellowish-green on the vent and under tail-coverts.

Distribution. The South-West coast of India from South Travancore to the Bombay Presidency on the North as far as Poona. East it only extends to Mysore, the Nilgiris, Palnis and adjoining hills.

Nidification. Bourdillon and Stewart found this Paroquet breeding in Travancore in January, February and March. They are forest breeders generally placing their eggs in holes at a considerable height from the ground and laying three to four eggs. A series of twenty obtained by Stewart and five in the British Museum Collection average 28·3 × 24·0 mm.: maxima 30·3 × 25·1 mm.; minima 27·0 × 22·3 mm.

Habits. Much the same as those of the other species but more entirely a bird of forests, both deciduous and evergreen. It collects in small flocks of about a dozen or twenty birds and utters the usual cries, though perhaps rather soft and mellow in comparison with most. They are said to be fruit, rather than grain and berry eaters and never do any damage to crops.

(1507) Psittacula calthropæ.

LAYARD'S PAROQUET.

Palæornis calthropæ Layard, J. A. S. B., xviii, p. 800 (849) (Ceylon); Blanf. & Oates, iii, p. 256.

Vernacular names. *Allu-girawa* (Cing.).

Description.—Male. Feathers round the eye, cheeks and a narrow forehead bright green; chin and a broad band on either side of the throat black; remainder of head lavender-blue; a broad collar on the hind-neck and the breast and lower plumage bright green; back and scapulars lavender-blue washed with green; rump and upper tail-coverts brighter lavender-blue; central tail-feathers deep purple-blue tipped with greenish-yellow;

lateral feathers blue on the outer webs narrowly edged with bright pale blue and greenish-yellow on the inner webs with broad yellow tips; wing dark green, yellowish next the scapulars and on the innermost secondaries; outer primaries black on the inner webs.

Colours of soft parts. Iris white to greenish-white or yellow; bill coral-red, tipped paler in the males; black in the females and young, the lower mandible sometimes tinged with reddish; legs and feet dusky green, greenish-plumbeous or dirty green.

Female. Similar to the male but more dully coloured, especially on the head.

Young birds are green throughout.

Measurements. Wing 130 to 143 mm.; tail, ♂ 138 to 144 mm., ♀ 101 to 114 mm.; tarsus 13 to 14 mm.; culmen 21 to 23 mm.

Distribution. South and Central Ceylon.

Nidification. This beautiful little Paroquet breeds in Ceylon from January to March from the plains adjacent to the hills and up to 6,000 feet. The nest-hole, generally a natural one, sometimes cut out by the birds, may be low down in a rotten stump or high up in a forest tree. The eggs number one to three and nine eggs, all that I know of, average 24·7 × 19·3 mm.: maxima **26·0** × 19·6 and 25·6 × **19·7** mm.; minima **23·0** × 19·6 and 23·9 × **19·0** mm.

Habits. This is an exclusively forest Paroquet, though preferring open glades, the banks of of rivers, etc., to the denser parts. Its rapid and very direct flight as well as its much harsher voice is said to render it easy to distinguish. It is a common bird, though rather locally distributed, collecting in quite small flocks and feeding almost entirely on lofty trees.

Psittacula alexandri.

Psittacus alexandri Odhel, Linn. Amœn. Acad., iv, p. 236 (1754).

Type-locality: Java.

The typical form is smaller than the bird found in India and has the bill wholly red both in the male and in the female.

(1508) Psittacula alexandri fasciatus.

THE INDIAN RED-BREASTED PAROQUET.

Psittacus fasciatus Müller, Nat. Syst. Suppl., p. 74 (1776) (Pondicherry).
Palæornis fasciatus. Blanf. & Oates, iii, p. 256.

Vernacular names. *Madna*, *Kájila*, *Gour Tota* (Hind.); *Imrit Bhela* (Nep.); *Dao-bator gajao* (Cachari).

Description.—Male. A line across the forehead running back to the eye black; a broad band from the base of the bill on either

side of the neck black; rest of head plum-grey, the lores and feathers round the eye washed with green; hind-neck and sides of neck very bright grass-green; back, scapulars, rump and upper tail-coverts less bright grass-green, almost always showing faint darker vermiculations; tail bluish-green, the central tail-feathers blue with green edges to the base and with small pale tips; coverts next the scapulars greenish golden-yellow, remainder of wing green, the quills edged with yellowish and the primaries brown on the inner webs, getting greener on the outer and all green on the innermost secondaries; secondaries and innermost primary also edged narrowly on the inner web with pale ochre; chin dull white; throat and breast vinaceous-red tinged with plum-colour next the black on the neck; abdomen pale bluish-green, more yellow on the vent and under tail-coverts; axillaries and under wing-coverts pale green.

Colours of soft parts. Iris straw-yellow to bright pale yellow; upper mandible coral-red, lower brownish-black; legs and feet dusky greenish-yellow or pale yellowish-slate.

Measurements. Wing, ♂ 162 to 174 mm., ♀ 157 to 162 mm.; tail, ♂ 168 to 189 mm., ♀ 145 to 171 mm.; tarsus 16 to 17 mm.; culmen 23 to 28 mm.

Female. The head duller, generally more tinged with blue or green and with less plum-coloured sheen; the breast is redder and darker untinged with plum.

The upper mandible is black, the iris whity-yellow.

Young birds are green throughout but show a certain amount of plum-colour, rather dull and brownish, about the head and also acquire the black on the forehead and neck after the first moult.

Nestlings have both mandibles horny reddish-orange.

Distribution. The Lower Himalayas from Kuman to East and South Assam; Manipur; Tippera, Comilla and Chittagong in Eastern Bengal; the whole of Burma and Indo-Chinese countries; Yunnan and West China to South China and Hainan. It is common in the Andamans but does not occur in the Nicobars.

Nidification This large Paroquet begins to breed as early as the end of December and I have shot fully-plumaged birds of the year on the 12th March, strong and swift on the wing. The latest date I have taken eggs was on the 10th of April. They breed from the level of the plains up to some 6,000 feet but are more common in most places below, rather than above, 3,000 feet. They lay three or four eggs, fifty of which average 30·9 × 25·6 mm.: maxima 33·1 × 29·0 mm.; minima 26·9 × 23·0 mm. They nest both in forest, deciduous and evergreen, and on the fringes of cultivation, selecting nesting-sites at any height from five to fifty feet up. I have seen six pairs breeding in one big tree and scattered colonies of twenty to a dozen pairs breeding in one small patch of cover.

Habits. Athough never collecting in the enormous numbers some of its relations do, this is an extremely common bird through the greater part of its range and the flocks may sometimes number several hundred. Generally, however, the flocks are much smaller, though several such may be found quite close to one another. They feed on fruit, berries, shoots and buds as well as on ripe or semi-ripe grain of all kinds. Their voice is the loudest and most raucous of all the oriental Paroquets and their deep, trumpet-like scream can be heard at a great distance. They are easily tamed even when caught full-grown and are, perhaps, the best mimics of all our Indian species. Individual males are sometimes very savage both to people or to small birds in the same cage, often murdering and eating the latter.

(1509) Psittacula caniceps.

BLYTH'S NICOBAR PAROQUET.

Palæornis caniceps Blyth, J. A. S. B., xv, p. 23 (1846) (Nicobars); Blanf. & Oates, iii, p. 258.

Vernacular names. None recorded.

Description.—Male. A broad black frontal line running back to the eye; a very broad black band from the base of the lower mandible running back on either side of the throat and then up in a narrow line partly up the sides of the neck; remainder of head, back and sides of neck brownish-grey, changing gradually into the bright yellow-green of the upper plumage and wings; middle tail-feathers bluish at the base and violet-grey on the terminal halves; primary-coverts and quills black; the outer feathers edged with bright green and sub-edged with deep blue, the inner secondaries practically all dark green; lower plumage, axillaries and under wing-coverts green like the back.

Colours of soft parts. Iris orange-red; upper mandible coral-red in the male, black in the female; lower mandible black in both sexes; feet plumbeous red.

Measurements. Wing, ♂ 202 to 222 mm., ♀ 195 to 212 mm.; tail 290 to 345 mm.; tarsus 20 to 21 mm.; culmen 28 to 30 mm. The female has as long a tail as the male in this species.

Female. Similar to the male but the head much duller and strongly washed with dull pale blue.

Distribution. Nicobars only.

Nidification. Unknown.

Habits. Davison says that this is a noisy bird with the usual rapid flight, generally found singly or in small parties in high forest.

Psittacula erythrogenys.

Key to Subspecies.

A. Back yellowish-green with little or no lilac tinge ..... *P. e. erythrogenys*, p. 213.
B. Back more blue, with a strong lilac tinge ..... *P. e. tytleri*, p. 214.

These two birds might possibly be treated as subspecies of *P. longicauda* Bodd., 1783, of Malacca to Borneo, together with *P. modesta* from Engano.

(1510) Psittacula erythrogenys erythrogenys.

THE NICOBAR RED-CHEEKED PAROQUET.

Palæornis erythrogenys Blyth, J. A. S. B., xv, p. 23 (1846) (Nicobars); Blanf. & Oates, iii, p. 258.

Vernacular names. None recorded.

Description.—Adult male. A line from the forehead to the eye black; a broad black mandibular streak on either side of the throat and running up in a narrower line on the neck as a demi-collar; lores, sides of head and neck bright pinkish brick-red; crown and nape grass-green, changing into pale yellowish-green on the upper back and scapulars and sometimes with a faint lilac-tinged collar on the hind-neck; lower back more blue; rump and upper tail-coverts bright grass-green; central tail-feathers blue, tipped and edged on the basal half with green; lateral tail-feathers green with more or less blue along the shafts; wing-coverts and innermost secondaries yellowish-green; primary-coverts blue; primaries blue edged with green on the outer webs, black on the inner webs, the blue and green increasing in extent until the outer secondaries are dark green centred with blue; lower plumage pale green, palest and yellowish on the breast, darker and greener on the abdomen, vent and under tail-coverts; axillaries and under wing-coverts bright pale green, the edge of the wing yellowish.

Colours of soft parts. Iris yellow, creamy-white, or pale brown; bill in males, upper mandible vermilion, yellow at the tip, lower horny-black, yellowish-horny or dingy red; in females both mandibles are blackish; in very young birds of both sexes dull red; legs dull earthy or dingy green (*Hume*).

Measurements. Wing, ♂ 186 to 192 mm., ♀ 178 to 187 mm.; tail, ♂ 250 to 286 mm., ♀ 180 to 205 mm.; tarsus 18 to 20 mm.; culmen, ♂ 26 to 28 mm., ♀ 24 to 25 mm.

Female. The red on the head is paler and duller and the whole upper plumage is almost concolorous; the black mandibular stripe is tinged with green.

Distribution. Nicobar Islands.

Nidification. Davison found nest-holes of this Paroquet in Trinkut Island on the 17th February and 2nd March, both containing two young birds. One nest-hole was up about 12 feet in a Screw-Pine (*Pandanus*), the other nearly 30 feet up in a forest tree. The eggs have not been taken.

Habits. Similar to those of the next race as far as is known.

(1511) Psittacula erythrogenys tytleri.

THE ANDAMAN RED-CHEEKED PAROQUET.

Palæornis tytleri Hume, P. A. S. B., 1874, p. 108 (Andamans); Blanf. & Oates, iii, p. 259.

Vernacular names. None recorded.

Description.—Male. Differs from the preceding bird in having the yellow tinge of the back replaced by a strong violet wash and the blue of the lower back much more developed; the lower plumage is much less yellow and much more bluish.

Colours of soft parts as in the Nicobar bird.

Measurements. Wing, ♂ 173 to 182 mm., ♀ 165 to 173 mm.; tail, ♂ 235 to 253 mm., ♀ 178 to 204 mm.; tarsus about, ♂ 19 to 20 mm., ♀ 17 to 18 mm.; culmen, ♂ 23 to 25 mm., ♀ 22 to 23 mm.

Female is paler above than that of *P. e. erythrogenys* and more tinged with bluish.

In both sexes of both races the feathers of the upper parts, if closely looked into, are seen to have paler edges with traces of faint darker vermiculations.

Distribution. The whole Andaman group, including Barren Is., Narcondam, the Cocos and Preparis.

Nidification. Osmaston, Wickham and Anderson took eggs of this bird from the end of February to the end of March, the nest-holes, generally natural hollows, being about 15 to 25 feet from the ground in trees forming avenues round about Port Blair or actually in the forest. The eggs, two or three, once four, in number, are just like those of other Paroquets. Thirty average 30·6 × 24·7 mm.: maxima **34·2** × 25·0 and 30·1 × **26·1** mm.; minima **28·4** × 24·4 and 30·9 × **23·0** mm.

Habits. This is a very common Paroquet over all the Andamans and though probably originally entirely a forest bird is now found in all the cultivated land round about Port Blair, where it is very tame and confiding. Its flight, voice, etc., are all typical of the genus.

Genus PSITTINUS.

Psittinus Blyth, J. A. S. B., xi, p. 789 (1842).

Type, *Psittacus incertus* Shaw.

In this genus the tail is very short, less than half as long as the wing and only moderately graduated; the bill is much the same as in *Psittacula*. The sexes differ considerably in colour.

The genus contains but one species, *P. incertus*.

Psittinus incertus.

Psittacus incertus Shaw, Nat. Misc., pl. 769 (1790).

Type-locality: India.

The typical form differs principally in size from that found in the Northern Malay Peninsula and Tenasserim.

The name *malaccensis* which has been employed for the Malayan race cannot be used as it is preoccupied by Forster in 1781. The next name available is *macropterus* of Kuhl (Consp. Psitt., 1820).

(1512) Psittinus incertus macropterus.

THE LITTLE MALAY PARROT.

Psittacus macropterus Kuhl, Consp. Psitt., p. 67 (1820) (Malacca).
Psittinus incertus. Blanf. & Oates, iii, p. 260.

Vernacular names. None recorded.

Description.—Male. Whole head and neck grey-blue, bluest on the crown and more grey on the nape and neck; upper back and scapulars brownish-black, the feathers when fresh with tiny green fringes, sometimes the scapulars and feathers next the lower back green (? young birds); lower back, rump and upper tail-coverts blue, generally more or less tinged with green; central tail-feathers green, outer tail-feathers yellow edged with green on the outer webs; wing-coverts green, boldly edged with yellow and with a patch of maroon-red next the scapulars; primary-coverts blue edged with green; primaries green on the outer webs, black on the inner, the green increasing until the inner primaries are all green; innermost secondaries like the coverts; chin and throat yellowish or greenish-white; lower parts green, the breast often much suffused with grey and the flanks and abdomen with blue; under aspect of tail bright yellow; axillaries and under wing-coverts crimson.

Colours of soft parts. Iris creamy-white, eyelids and cere greenish-brown or dull greenish; males, upper mandible orange-vermilion, lower dusky or dull reddish-brown; females, both mandibles usually whitish; legs and feet pale dirty green (*Davison*).

Measurements. Wing 113 to 126 mm.; tail 44 to 50 mm.; tarsus 13 to 15 mm.; culmen, ♂ 20 to 21 mm., ♀ 19 to 20 mm.

Female. Head and back green, the brown bases of the head-feathers showing through; rump and upper tail-coverts green, the former more or less washed with blue; wings and tail as in the male; below much duller and darker green without any blue wash.

Young birds are dark green above and below but have the deep red wing-patch, the crimson wing-lining and generally more or less blue on the lower back.

Distribution. Tenasserim, South from about 100 miles North of Nwalabo and Tavoy to Singapore; South-West Siam.

Nidification. Mr. W. A. T. Kellow took several clutches of eggs of this little Parrot in the dense evergreen forests near Simpang during the month of May. They were all said to have been deposited in quite small natural hollows very high up in tall forest trees. The eggs, all incubated, numbered one to three and nine average 24·2 × 20·0 mm. and vary between 22·9 × 17·5 and 26·1 × 21·3 mm. The texture is similar to that of the eggs of *Coryllis*, rather coarser and stouter than the eggs of *Psittacula*. I should doubt if May is the normal breeding-season.

Habits. This little Parrot is probably resident wherever found. Hopwood obtained it in forests about 100 miles North of Tavoy in January and thinks that even as far North as this it is resident. It appears to breed in evergreen forest but in the non-breeding season to frequent brushwood and deciduous thin forest, feeding principally on the "small gummy flowers of a plant that always grows where forest has been felled and burnt." Davison also says that their usual note is a sharp not unpleasant whistle and that they have a series of warbling notes which they utter when seated. Their flight is very swift and strong and they indulge much in aerial exercises and evolutions, whistling loudly as they fly. They collect in small parties in the non-breeding season.

Genus **CORYLLIS**.

Coryllis Finsch, Papag., ii, p. 687 (1868).

Type = *Loriculus* Blyth = *Psittacus galgulus* Linn.

This genus differs from *Psittinus* in its much smaller bill; it is much more compressed and the culmen is less curved, whilst the depth of the two mandibles closed is less than the length of the upper mandible.

Key to Species.

A. Crown green ..... *C. vernalis*, p. 217.
B. Crown red ..... *C. beryllinus*, p. 219.

Coryllis vernalis.

Key to Subspecies.

A. Brighter, more yellow-green above .... *C. v. vernalis*, p. 217.
B. Darker, less yellow-green above ..... *C. v. rubropygialis*, p. 218.

(1513) Coryllis vernalis vernalis.

THE INDIAN LORIQUET.

Psittacus vernalis Sparrm., Mus. Carls., No. 29 (1787) (Cachar).
Loriculus vernalis. Blanf. & Oates, iii, p. 261 (part).

Vernacular names. *Latkan* (Hind. in Beng.); *Kyay-thatah, Kyi-gyok, Kyun-hto* (Burm.); *Dao-bator-lai* (Cachari).

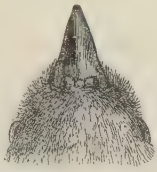

Fig. 32. - Head of *C. v. vernalis.* ½.

Description.—**Male.** Upper parts bright yellowish grass-green; rump and upper tail-coverts rich crimson-red; tail green; lesser and median wing-coverts and inner secondaries green, rather darker than the back; greater and primary-coverts still darker green; quills black on the inner, green on the outer webs, the innermost primaries and outer secondaries all green; under aspect of both tail- and wing-quills a most beautiful verditer-blue; lower plumage yellowish-green, more yellow and paler than the back; a small patch on the throat suffused with blue; under wing-coverts and axillaries pale green.

Colours of soft parts. Iris yellowish-white or straw-yellow; bill coral-red, yellow at the tip, cere darker red; legs and feet yellowish, pale orange or pale yellowish-slate.

Measurements. Wing 83 to 97 mm.; tail 36 to 38 mm.; tarsus 9 to 10 mm.; culmen 10 to 11 mm.

Female a little darker and duller than the male and with little or no blue patch on the throat.

Young males have the red rump mixed with green.

Distribution. Himalayas from Sikkim to Eastern and Southern Assam; Tippera, Comilla and Chittagong in Eastern Bengal; all Burma to the extreme South; Andamans; peninsular South-West Siam.

Nidification. The Indian Loriquet breeds in Assam from February to the end of April, in the Andamans from January

to March and in Burma during January and February, laying three to four eggs, white as usual but often very much stained. In shape they are broad, blunt ovals, the texture coarse and porous though fine on the surface. The situation chosen is almost invariably very low down in some old stump or rotten tree, sometimes indeed below the level of the ground. The nest-hole is a natural one, generally very small and sometimes the entrance is enlarged by the birds themselves. Thirty eggs average 19·1 × 15·8 mm.: maxima **21·0** × 15·5 and 19·4 × **17·0** mm.; minima **17·5** × 15·3 and 18·2 × **15·1** mm.

Habits. The Indian Loriquet by preference frequents deciduous forest, secondary growth on deserted cultivation or mixed brush and thin jungle, occasionally being also found in evergreen forest, especially when this surrounds Cotton-trees in flower, on which it feeds in company with many other birds. It has a curious habit of suddenly flying off the tops of these great trees and wheeling about in wide circles, whistling loudly all the time and then, equally suddenly hurling itself, with the rest of the flock, back on to the tree where they settle down for a few minutes, all twittering and warbling together as they feed. It is not shy and when breeding is very bold, generally sitting until removed from the nest and, when caught, very easily tamed, becoming most affectionate and confiding. It feeds on flowers, fruit and the hardest of nuts and berries and its flight is as quick and powerful as that of the genus *Psittacula*, though not so long sustained.

(1514) Coryllis vernalis rubropygialis.

THE MALABAR LORIQUET.

Coryllis vernalis rubropygialis Stuart Baker, Bull. B. O. C., xlvii, p. 44 (1926) (Belgaum).
Loriculus vernalis. Blanf. & Oates, iii, p. 261 (part).

Vernacular names. *Bhora, Bhoara* (Hind. in S. India).

Description. Similar to the preceding bird but much darker both above and below. The rump also is a deeper, duller red, although there is some variation in this character; the under surface of tail and wing-quills seems rather darker.

Colours of soft parts. Jerdon describes the legs as "leaden" but other observers give the colour of iris, bill, legs and feet as in the North Indian bird.

Measurements. Wing 81 to 88 mm.; tail 33 to 34 mm.; tarsus 8 to 9 mm.; culmen 10 to 11 mm.

Distribution. The South-West coast of India from Cape Comorin to the latitude of Bombay City. East it occurs in the Nilgiris and adjoining hills.

Nidification. Bourdillon took three eggs of this race from a natural hole in a stump about 15 feet from the ground on the 15th March, whilst Stewart took three, hard set, from a

similar position on the 6th of January. Both were taken in Travancore and each case in the low hills, about 2,000 feet, in clearings in deep forest. The three eggs taken by Stewart measure 20·5 × 16·0 mm., 18·6 × 16·8 and 18·6 × 16·0 mm. The texture is very strong, the shells stout but rather porous with no gloss and stained a uniform pale brown.

Habits. Much the same as those of the Indian Loriquet.

(1515) Coryllis beryllinus.

THE CEYLON LORIQUET.

Psittinus beryllinus Forster, Ind. Zool., p. 40 (1781) (Ceylon).
Loriculus indicus. Blanf. & Oates, iii, p. 262.

Vernacular names. *Malitcha*, *Pol-girawa* (Cing.).; *Kanni-kili* (Tam.).

Description. Very like the preceding bird but generally rather darker; the crown is red like the rump, this colour becoming orange on the nape and still showing as a gloss on the neck, upper back and interscapulars.

Colours of soft parts. Iris white; bill light orange-red, the cere yellow; legs and feet dusky yellow.

Measurements. Wing 92 to 99 mm.; tail 43 to 44 mm.; tarsus 9 to 10 mm.; culmen 11 to 12 mm.

Distribution. Ceylon.

Nidification. According to Wait the breeding-season of this little Loriquet is from March to June, two or three eggs being laid in natural hollows in trees in gardens or forest. Three eggs in my collection measure 18·8 × 14·8, 18·9 × 15·0 and 18·4 × 14·9 mm. They only differ from the eggs of *Coryllis vernalis* in being smaller and less broad in proportion.

Habits. Apparently the Ceylon Loriquet is a much more familiar bird than its Indian relations, being frequently found in gardens and round about villages and plantations. In flight, food, etc., it is similar to the other species but Wait says that it is an extremely greedy little bird, feeding to stupefaction on "kitul toddy," a beverage of which it is especially fond. It occurs in the low country and also in the hills up to some 4,000 feet.

Suborder **CORACII.**

In the first edition of the 'Avifauna' Blanford included in his Order *Anisodactyli* five Suborders each containing a single family. In the present work, following Pycraft and other modern systematists, the *Coracii* are reduced to the rank of a Suborder of the *Coraciiformes* and the five Suborders of Blanford fall accordingly to the status of Families, although these are divided by important structural differences such as might well be considered worthy of higher rank but that they are all linked together by other still more important characters.

In the *Coracii* the palate is always desmognathous; the basipterygoid processes rudimentary or absent; the syrinx tracheobronchial. The ambiens muscle is never present but all five families possess the femoro-caudal, semi-tendinosus and accessory semi-tendinosus thigh-muscles. The hallux is always present and, except in a few genera, there are three anterior toes more or less joined together at the base; the deep plantar tendons in all but the Hoopoes coalesce more or less completely either before their subdivision to supply the different digits or at a point below that at which a slip leaves the *flexor perforans digitorum* to supply the hind toe. In *Upupa* the *flexor perforans digitorum* supplies the second and fourth toe and the *flexor longus hallucis* the second and third.

Key to Families.

A. Oil-gland nude; cæca present; four notches behind sternum.
  a. Two carotids; manubrium sterni simple, no foramen behind it ..... **Coraciidæ**, p. 221.
  b. Left carotid only; manubrium sterni complex and with perforation to receive ends of coracoids ..... **Meropidæ**, p. 232.

B. Oil-gland tufted; cæca absent.
  c. Four notches behind sternum ..... **Alcedinidæ**, p. 245.
  d. Two notches behind sternum.
    a'. No lateral bare tracts (apteria) on neck; eleven primaries ..... **Bucerotidæ**, p. 282.
    b'. Lateral cervical apteria present; ten primaries ..... **Upupidæ**, p. 307.

Family CORACIIDÆ.

Long cæca present; oil-gland nude; sternum with a double notched posterior border; the manubrium sterni consists of the outer process only and is long and not distinctly notched; both carotids are present; the spinal feather-tract is well-defined on the neck, forking on the upper back to leave a dorsal apterium. There are fourteen vertebræ. The deep plantar tendons unite completely before subdividing at all. The wing is eutaxic.

In this family the bill is large and corvine in shape, the upper mandible notched beneath near the tip; the culmen is rounded; the nostrils near the base of the mandible. Outer and middle

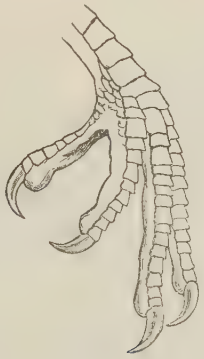

Fig. 33.—Left foot of *C. b. benghalensis*.

toes united at the extreme base, the inner and middle toes throughout the basal joint. Primaries ten; tail-feathers twelve. Sexes alike and young like the adults.

This family is found throughout the tropical and temperate countries of the Old World.

Key to Genera.

A. Bill compressed; breadth at gape about half length of culmen ..... CORACIAS, p. 222.

B. Bill short, broad and swollen at base; breadth at gape about equal to culmen ..... EURYSTOMUS, p. 228.

Genus **CORACIAS.**

Coracias Linn., Syst. Nat., 10th ed., i, p. 107 (1758).

Type, *Coracias garrulus* Linn.

The genus *Coracias* contains the Rollers, or Blue Jays as they are popularly called in India, birds which extend throughout Europe and a great part of Asia and Africa.

The bill is rather long, compressed and with the culmen slightly curved; the nostrils are elongate and exposed; the gape wide with strong rictal bristles.

Key to Species.

A. Lower plumage pale blue throughout .... *C. garrula*, p. 222.
B. Breast rufous, abdomen and lower tail-coverts blue ..... *C. benghalensis*, p. 224.

Coracias garrula.

Coracias garrulus Linn., Syst. Nat., 10th ed., i, p. 107 (1758).

Type-locality: Sweden.

Differs from our Indian bird in being lighter in colour both above and below with a more greenish head and neck.

(1516) Coracias garrula semenowi.

The Kashmir Roller.

Coracias garrula semenowi Loud. & Tschusi, Orn. Jahrb., xiii, p. 148 (1902) (Transcaspia).
Coracias garrula. Blanf. & Oates, iii, p. 106.

Vernacular names. *Nila kras* (Kashmir); *Khundar* (Mesopot.).

Description. Forehead, narrowly, lores, next the lower mandible and chin brownish-white; whole head, neck, and lower parts, under wing-coverts and axillaries pale blue, palest and tinged with green on the abdomen and vent, darkest and streaked with brilliant smalt-blue on the breast and throat; back, scapulars and innermost secondaries light rufous-brown; rump and upper tail-coverts blue, generally the former deep blue, the latter pale but varying greatly and sometimes all pale blue; central tail-feathers dull dark green; lateral tail-feathers bluish-green with a broad pale blue terminal band and the outermost pair tipped with blue-black; inner wing-coverts deep blue; outer pale dull blue, the primary-coverts still paler but brighter blue; quills black, overlain with deep blue on the outer webs and deep blue on the inner web underneath; the bases of the five inner primaries are pale bright blue on both webs.

Colours of soft parts. Iris pale brown to hazel-brown; bill brownish-black to black; legs and feet dull yellow.

Measurements. Wing 180 to 210 mm.; tail 122 to 135 mm.; tarsus 25 to 26 mm.; culmen 30 to 35 mm.

Young birds are like the adults but paler and duller; the wing-quills are tipped browner and the blue of the coverts is dull and pale.

Distribution. Transcaspia and Turkestan to Kashmir, Baluchistan, Afghanistan and the North-West Frontier.

Kashmir birds are very large, 194 to 210 mm. as compared with 180 to 199 mm. from Mesopotamia, Persia, Afghanistan, Baluchistan and the Punjab. They also have extremely long tails and large bills, 129 to 135 mm. against 121 to 126 mm. in the former and 31 to 35 mm. as against 30 to 32 mm. in the latter. It is possible they should be separated but there are no good colour characteristics to support a division by measurements.

Nidification. This Roller breeds in Kashmir in May and June, laying its eggs in holes in trees, buildings or banks and cliffs by rivers. Probably its favourite site is a high river-bank of light and easily-worked, but not too sandy, soil. In these places many pairs breed fairly close together. Thus Davidson found eight nests with eggs or young in June in one stretch of river-bank in Kashmir, whilst Pitman, Cheeseman and others found them breeding in regular colonies on the Euphrates. One such colony contained 24 nests of the Roller and one of a Kestrel. No nest-lining, other than such as is accidental, seems ever to be put into the nest, and the eggs are deposited either on the bare earth or on the decayed wood of hollows in trees. The eggs number three to seven in Mesopotamia and four to six in Kashmir, the much greater size of the latter eggs being very noticeable. They are pure white, very hard and glossy and generally with a great many tiny pit-marks, hardly to be seen without a glass. Fifty eggs average 35·9 × 28·1 mm.: maxima **39·0** × 28·9 and 35·9 × **30·0** mm.; minima **33·3** × **26·2** mm. Kashmir eggs average about 3 × 2 mm. bigger than other eggs.

Habits. The Kashmir Roller is one of the commonest birds in Kashmir during the Summer, frequenting the more open, less-forested tracts round about cultivation, grass plains and plateaus, etc. Rollers are most active, especially in the hotter countries, during the mornings and evenings, when they are constantly on the move. Their flight is flapping and deliberate but they are capable of considerable speed when required and they spend much of their time performing acrobatic feats in the air, first twisting one way, then the other and often making a complete turn. As a rule their performances are accompanied by much harsh croaking and shrieking, the Roller's voice being as unpleasant as his plumage is beautiful. During the heat of the day he perches high up on some branch or building, whence, though apparently asleep, he keeps an observant eye on all that happens around him, every now and then sallying forth to catch an insect on the wing or to seize some unlucky object whose movement on the grass

below him has attracted his attention. The main diet of the Roller consists of grasshoppers of all sizes, but there is not much that moves and lives and is sufficiently small that he will not seize and eat. They have been observed catching fish fry when trapped in shallow pools, whilst field-mice, lizards, beetles, however large, and all other insects are eaten by them.

Coracias benghalensis.

Key to Subspecies.

A. Under wing-coverts pale blue.
  a. Nuchal collar absent or obsolete ..... *C. b. benghalensis*, p. 224.
  b. A well-defined deep red collar on the hind-neck ..... *C. b. indica*, p. 226.
B. Under wing-coverts deep blue ..... *C. b. affinis*, p. 226.

(1517) Coracias benghalensis benghalensis.

THE INDIAN ROLLER.

Coracias benghalensis Linn., Syst. Nat., 10th ed., i, p. 106 (1758) (Bengal).
Coracias indica. Blanf. & Oates, iii, p. 103 (part).

Vernacular names. *Nilkant*, *Sabzak* (Hind.); *Tas* (Mahr.); *Palu Pitta* (Tel.); *Kattu kadei*, *Pal kuruvi* (Tam.).

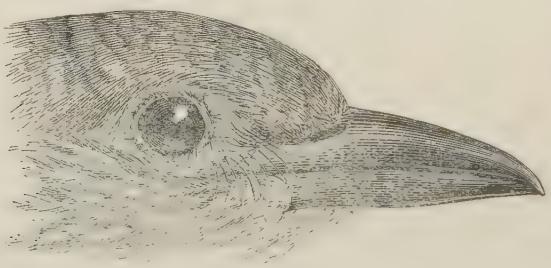

Fig. 34.—Head of *C. b. benghalensis*.

Description. Lores, forehead and chin rufous or brownish-white; crown and nape bluish-green, brightest and most blue above the eye; back, scapulars and innermost secondaries dull greenish-brown; the hind-neck and sides of neck generally overlain with dull purple, forming an indistinct collar; rump light greenish-blue mixed with deep blue; upper tail-coverts nearly all deep blue, tipped with pale blue; central tail-feathers dull green, tinged with deep blue near the base; outer tail-feathers pale blue, with deep blue bases and tips; sides of head and the throat purplish-red, with broad creamy shaft-stripes; upper breast the same, fading into vinous, unstreaked, pale brown or rufous-brown; wing-coverts next the scapulars and shoulder of wing

deep, bright blue; median wing-coverts pale blue; primaries deep blue on base and tip, pale blue between and black on basal half of inner web; secondaries deep blue with pale blue bases; posterior flanks, abdomen and under tail-coverts pale blue.

Colours of soft parts. Iris grey-brown; eyelid and naked orbital skin yellow; bill dark brown or blackish-brown; legs and feet yellowish-brown.

Measurements. Wing 180 to 195 mm. (one 172 mm.); tail 119 to 137 mm.; tarsus 26 to 27 mm.; culmen 30 to 37 mm.

Distribution. Practically the whole of India except the South of Travancore; West to North Punjab and Baluchistan; North to the foot-hills of the Himalayas, throughout their range in India; East to Bengal as far as Calcutta. In the North-East and East the range of this bird and *affinis* overlap considerably, but such overlapping seems to occur only in Winter and there is no proof of the breeding of both forms in one area; moreover, there are specimens which show intergradation between them. For the present, therefore, I keep them as subspecies, although it appears to be one of those cases in which nature is gradually eliminating the links between the two. It extends on the North-West all along the Persian coast and in Mesopotamia as far North as Amara.

Nidification. The "Blue-Jay," as this bird is called by Europeans in India, breeds from the end of March to the end of May, laying its four, more rarely five, white eggs in holes of trees, in old walls and buildings and sometimes even under the eaves of houses. Occasionally the eggs are laid on the bare wood or on the material forming the bottom of the hollow if the one selected is in a building. Generally, however, a certain amount of material, grass, straw and rubbish, is collected to form a bed for them to lie on and I have seen quite good and bulky nests made on several occasions. Any height seems to serve for the nest-hole, which may be within reach of the hand or fifty feet up in some unclimbable tree. Mango and Tamarind trees and dead Palms form very favourite sites and in the latter, when very rotten, the birds will themselves tear out dead wood to enlarge a convenient hole. The eggs are of the usual glossy white and fifty average 34·3×28·1 mm.: maxima 36·0×29·0 and 35·2×29·2 mm.; minima 32·0×28·7 and 33·0×26·0 mm. In spite of Aitken's long description of the cunning of this bird, their nests are really extremely easy to find, the cock bird always perching close by when his mate is sitting, whilst, normally, she does not leave the hole until the intruder is close to it. The eggs, I think, take 18 days to hatch but there is often an interval of two or three days between the hatching of the first and last. In Mesopotamia it seems to have two broods, the first lot of young hatching in May and the second lot in July.

Habits. The Indian Roller is one of the features of almost every Indian landscape in the more thickly-inhabited parts.

Every garden has its pair, every village several pairs, whilst it would be impossible to pass half-a-mile of telegraph wire without seeing one or more perched thereon. In some parts of Northern and Western India it is also found in the thinner deciduous forests as well as round the towns and villages. In flighting vagaries and in harsh noisiness it excels even its Kashmir relation, whilst it is equally omnivorous.

The Hindus hold the *Nilkant* sacred to Siva, so that it is never molested by them and a Mango grove is considered lucky if occupied by a pair for nesting purposes.

(1518) Coracias benghalensis indica.

THE SOUTHERN INDIAN ROLLER.

Coracias indica Linn., Syst. Nat., 12th ed., i, p. 159 (1766) (Ceylon); Blanf. & Oates, iii, p. 103 (part).

Vernacular names. *Panang-karda, Kolta kili* (Tam. in Ceylon); *Dumbona, Dunkawuluwa* (Cing.).

Description. Similar to the preceding race but smaller. Generally the colour above is darker and a trifle more green and the nuchal collar is deeper and more purple.

Colours of soft parts as in *C. b. benghalensis.*

Measurements. Wing 166 to 182 mm.; tail 114 to 127 mm.; tarsus 24 to 25 mm.; culmen 28 to 34 mm.

Distribution. Ceylon and South India.

Nidification. Similar to that of the Indian Roller. According to Wait the breeding season lasts from January to June but most birds lay in May. The nesting-hole is said to be generally lined with a little grass or vegetable fibre. The eggs number four or five and twenty-four average 35·2 × 27·7 mm.: maxima **38·4** × 28·5 and 38·0 × **29·5** mm.; minima **31·1** × 26·6 and 36·9 × **26·3** mm.

Habits. Like the other subspecies this race is a bird of civilization and the open country and is apparently never found in hills, heavy forest or actual deserts.

(1519) Coracias benghalensis affinis.

THE BURMESE ROLLER.

Coracias affinis McClell., P. Z. S., 1839, p. 164 (Assam); Blanf. & Oates, iii, p. 105.

Vernacular names. *Katnas, Konsa* (Assam); *Tak-ral* (Lepcha); *Hnet-Kah* (Burmese); *Dao-Gatang* (Cachari).

Description. A very much darker, deeper-coloured bird than either of the other races of this species; the whole of the under wing-coverts are deep purple-blue; the throat and lower parts are overlain everywhere, strongest on the flanks and throat, with a

gloss on the latter where the streaks are brilliant smalt-blue instead of whitish; the upper tail-coverts have less, and the rump more, deep blue; the pale blue on the lower surface is confined to the vent and under tail-coverts but sometimes encroaches on to the abdomen.

Colours of soft parts. Iris brown; the edge of the eyelids and bare skin in front of and behind the eye orange-yellow; bill almost black; legs dull yellowish-brown.

Measurements. Wing 184 to 204 mm.; tail 118 to 137 mm.; tarsus 26 to 28 mm.; culmen 30 to 36 mm.

Distribution. Assam and Eastern Bengal; all Burma South to Tenasserim; Cochin China, Yunnan, Siam and Annam; West it occurs in Bhutan, whilst in Sikkim the great majority of birds are intermediate and in Nepal, though the greater number are fairly true *C. b. benghalensis*, others again more nearly approach the Burmese race.

Nidification. In Northern Burma this Roller breeds principally in May but in Southern Burma Bingham, Cook and Hopwood all found it breeding in March. In Assam, where it is extremely common, most eggs are laid in April but I have seen advanced young in early April and fresh eggs in July. Most birds rear but one brood but a few may hatch out a second after the break of the rains. The normal full clutch of eggs is four, occasionally three or five. Twenty eggs average 34·7 × 27·9 mm.: maxima 36·9 × 28·0 and 35·8 × 29·9 mm.; minima 31·4 × 28·0 and 34·5 × 26·5 mm.

Habits. This Roller is much more a bird of light forest than are its Indian and Ceylonese cousins but it keeps either to the fringes of the heavier forest or to deciduous forest and to bamboo- and scrub-jungle. It is, of course, most common round villages and in well-wooded cultivation but I have seen it in small patches of cultivation in the centre of evergreen forest. Its voice is as raucous and as freely uttered as that of the Indian Roller and it indulges in the same wonderful contortions in the air. The sight of half-a-dozen or more pairs of this bird hawking for insects over a jungle fire is really something to be remembered, for surely no other bird goes through so great a range of movements without apparent purpose. They feed principally on grasshoppers and cicadæ, which latter they pick off the bark of the trees, whilst the former they take in the air or seize on the ground. Like all the Rollers they are most active in the evenings and mornings but feed at odd times, even in the hottest hours of the day. During this period they do not seek shelter in the shade but remain perched up on some leafless branch in the full glare of the sun.

Genus EURYSTOMUS.

Eurystomus Vieill., Analyse, p. 37 (1816).

Type, *Eurystomus orientalis* Linn.

In this genus the bill is short, broad and very stout, the width at the gape being about equal to the length of the culmen, the terminal quarter is compressed and the upper mandible strongly hooked, the nostrils are exposed and there are no rictal bristles; tail almost square; wing long and pointed, second primary longest.

Eurystomus orientalis.

Stresemann, Nov. Zool., xx, p. 297 *et seq.*, has considered very carefully the question of the races into which this species can, or should in his opinion, be divided. He accepts *E. o. orientalis*, restricted theoretically to Sumatra, Java, Borneo, Philippines and other islands; *E. o. calonyx*, a very widely-spread Northern and Eastern form and many island races which do not come within the purview of this work except *E. o. gigas* from the Andamans, a bird easily distinguished from all others by its huge bill. Under the names *E. o. orientalis* $\leqq$ *E. o. calonyx*, birds attributable definitely neither to one or the other race, he gives a list of 98 birds from practically every locality other than those to which he restricts true *E. o. orientalis*. When, however, we examine the material in the British Museum, we find that even in this latter area typical *E. o. calonyx* occurs, whilst the majority of specimens are intermediate between the two extremes of colour-phase. As I find it impossible to define any geographical area in which either form breeds exclusively, I retain all, except *E. o. gigas*, under the one name.

Key to Subspecies.

A. Bill smaller; culmen about 23 to 26 mm. *E. o. orientalis*, p. 228.
B. Bill larger; culmen about 27 to 30 mm. *E. o. gigas*, p. 231.

(1520) Eurystomus orientalis orientalis.

THE BROAD-BILLED ROLLER.

Coracias orientalis Linn., Syst. Nat., 12th ed., i, p. 159 (1766) (India; Java, sub-desig. Stresemann).
Eurystomus orientalis. Blanf. & Oates, iii, p. 107.

Vernacular names. *Tak-räl-vong* (Lepcha); *Mo-gous-hnet* (Burmese); *Puluppōrukki* (Tam.).

Description. Top and sides of head and neck dark brown, tinged with olive in varying degree and blackish on the forehead, lores and cheeks; back dull dark greenish-brown, becoming brighter and greener on lower back, rump and upper tail-coverts;

tail black, more or less suffused with deep purple-blue and the central pair with a little greenish-blue at the base; wing-coverts and innermost secondaries like the back but brighter and more blue, becoming more and more blue towards the edge of the wing; primary-coverts black glossed with blue; outer primaries black, with a broad pale blue band near the base; in some birds this band shows pale and blue on both webs, in others the outer web is more green and duller; next the blue patch there is a certain amount of deep purple-blue and the rest of the quills are black more or less glossed with deep blue; outer secondaries black, glossed with deep blue in varying degree; centre of chin, throat and fore-neck deep purple-blue, with shaft-stripes of smalt-blue; sides of chin, throat, neck and whole breast dull brownish-green, changing to pale, brighter bluish-green on the abdomen and under tail-coverts; axillaries and under wing-coverts bright pale blue-green.

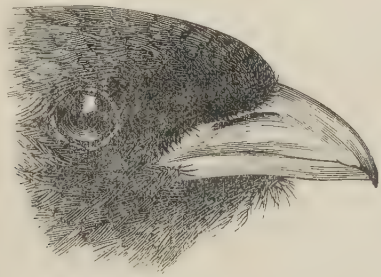

Fig. 35.—Head of *E. o. orientalis*.

Colours of soft parts. Iris dark brown to crimson-brown; bill deep vermilion, the tip blackish, gape orange or bright vermilion; legs and feet vermilion.

Measurements. Wing 178 to 202 mm.; tail 93 to 107 mm.; tarsus 19 to 20 mm.; culmen 23 to 26 mm.

Distribution. Foot-hills of Himalayas from Kuman to extreme Eastern Assam and Eastern Bengal, all Burma, Malay Peninsula to Java, Sumatra, Borneo, the Philippines, Celebes and numerous other islands, Siam, Yunnan, Indo-Burmese countries, Indo-China, East to Manchuria and Eastern China. In India it also occurs in the hills and adjacent plains of the West coast from Travancore North to the Wynaad and in Ceylon.

Nidification. The Broad-billed Roller is essentially a forest breeder, though its favourite site is high up in some dead tree in a rice patch on a hill-top surrounded with virgin forest. Next to this it prefers one of the mighty Bombax-trees, which rear their heads far above their lesser forest brethren. These trees, too, seem to suffer a curious disease in their greater branches which

cause a large swelling, some two feet in diameter, the rotten centre of which, when hollowed out, forms an admirable nest-hole. This may be sixty or a hundred feet from the ground, almost, if not quite, inaccessible without the expenditure of much time and trouble. The mighty trunks are far too big to climb and ladders of bamboo have to be made or bamboo pegs driven into the trunk before climbable branches can be reached. The hollow selected is, however, sometimes lower down, thirty feet or so from the ground, in dead stumps or comparatively small trees. No nest is made, the eggs being deposited on the bare dead wood. The hollow may be either an entirely natural one or may be enlarged and made more convenient by the birds themselves, a labour in which both sexes take part. The same nesting-site is often occupied by a pair of birds for several consecutive seasons. The eggs number three or four and are indistinguishable from those of other Rollers. Twenty-five eggs average 36·3×28·2 mm.: maxima 36·9×26·1 and 35·0×29·3 mm.; minima 31·7×25·6 and 32·5×25·3 mm.

The breeding-season over all their range seems to be March to May, except in Travancore where Bourdillon gives it as September to May, though even in this area most eggs are laid in March and April.

Habits. The Broad-billed Roller is entirely a forest bird wherever found, although it may prefer the more open parts or small patches of cultivation in the midst of forest. It is a much quieter bird than those of the genus *Coracias* and much more crepuscular in its habits. All through the hotter hours of the day it may be seen perched quietly high up on the loftiest tree of that particular bit of forest, or on the topmost branch of a dead tree in a clearing. As it sits motionless, its head sunk into the puffed-out feathers of its shoulder and breast, it seems to be fast asleep except for a harsh croak, uttered every quarter of an hour or so. But the would-be approacher, however noiseless he may be, soon finds it to be very wide-awake and few birds are more shy or hard to approach as a rule, though, on the other hand, occasional individuals seem tame to stupidity. On the few occasions this bird really indulges in noise, confined almost entirely to amorous demonstrations during the breeding-season, both sexes can vie successfully with the Indian Roller, but courtship is only a seasonal exhibition, for the birds pair for life. Their food has been said to consist principally of wood-boring beetles etc. but I have found it to be mainly grasshoppers, mantidæ and cicadæ.

(1521) Eurystomus orientalis gigas.

THE ANDAMAN BROAD-BILLED ROLLER.

Eurystomus orientalis gigas Stresemann, Nov. Zool., xx, p. 299 (1913) (South Andamans).
Eurystomus orientalis. Blanf. & Oates, iii. p. 107 (part).

Vernacular names. None recorded.

Description. Differs from *E. o. orientalis* only in having a much larger bill and average rather larger measurements.

Colours of soft parts as in *E. o. orientalis.*

Measurements. Wing 184 to 205 mm; tail 106 to 112 mm.; tarsus 21 mm.; culmen 27 to 30 mm.

Distribution. Andamans only.

Nidification. Unknown.

Habits. Similar to those of the preceding bird.

Family MEROPIDÆ.

In this family the left carotid only is present; the manubrium sterni is trifid, the inner portion being forked and the outer single with the coracoids crossing at their bases; behind the sternum is a foramen as in the *Bucerotidæ* and *Upupidæ*; cervical vertebræ fifteen; the *flexor perforans digitorum* supplies a slip to the hallux before uniting with the *flexor longus hallucis*, the united tendons then again divide into three to supply the three front toes. Toes syndactyle.

In this family the bill is long, slender and curved from the base, the culmen ridged; both mandibles pointed; the legs and feet are feeble, the outer and middle toe united by a membrane or web on the first two joints, the middle and inner by the basal joint only. Primaries ten; tail-feathers twelve. Sexes alike.

Genera of this family extend throughout the tropical and temperate regions of the Old World.

Key to Genera.

A. Breast and throat-plumes not greatly elongated.
  a. Middle pair of tail-feathers much longer than the lateral, attenuated and pointed.. MEROPS, p. 232.
  b. Middle pair of tail-feathers not longer than, and similar in shape to, the lateral ..... MELITTOPHAGUS, [p. 240.
B. Breast and throat-feathers elongate, loose and coloured differently to the surrounding plumage ..... BUCIA, p. 241.

Genus MEROPS.

Merops Linn., Syst. Nat., 10th ed., i, p. 117 (1758).

Type, *Merops apiaster*.

Bill long, slender and curved throughout, culmen ridged, both mandibles pointed; legs and feet feeble, syndactyle, the outer or fourth toe united to the third or middle toe as far as the last joint, second and third toes united to the basal joint only. Tail-feathers twelve. Primaries ten. Sexes alike or nearly so.

Key to Species.

A. Chin and throat yellow; central tail-feathers exceed the lateral by less than length of tarsus ..... *M. apiaster*, p. 233.
B. Throat green; central tail-feathers exceeding lateral by more than length of tarsus . *M. orientalis*, p. 234.
C. Throat chestnut; central tail-feathers exceeding lateral by more than length of tarsus ..... *M. superciliosus*, p. 237.

(1522) Merops apiaster.

THE EUROPEAN BEE-EATER.

Merops apiaster Linn., Syst. Nat., 10th ed., i, p. 117 (1758) (Europe); Blanf. & Oates, iii, p. 113.

Vernacular names. *Burra Harriál* (Hind.).

Description. Forehead white, changing into blue and then into green, continued as a small supercilium; crown, nape, hind-neck and upper back chestnut, deepest on the crown; lower back yellowish-chestnut; rump more green; upper tail-coverts greenish-blue; tail blue-green, the narrow tips black; scapulars yellow-buff, tinged with chestnut; lesser wing-coverts green; median and greater coverts chestnut; primary-coverts and edge of wing bluish-green; primaries green at the base, shading into blue and tipped with black; outer secondaries chestnut tipped with black; inner secondaries bluish-green, the under surface of the inner webs pale chestnut; lores and ear-coverts black; chin, throat and cheeks yellow, greenish next the bill and running into white on the sides of the neck; a black line next the yellow; lower plumage greenish-blue, paler on the vent and under tail-coverts, deepest on the upper breast; under wing-coverts and axillaries pale dull buff.

Colours of soft parts. Iris crimson or red; bill black; legs and feet brown.

Measurements. Wing 142 to 153 mm.; tail, central feathers 98 to 117 mm., outer 88 to 90 mm.; tarsus 12 to 13 mm.; culmen 34 to 38 mm.

Young birds have very little chestnut on the head or neck; the scapulars are pale green- or blue-grey, the tips almost white; the chestnut of the wings is replaced by chestnut-grey and the colours of the lower surface are pale and duller.

Nestling practically all green above, showing mere indications of the buff scapulars.

Distribution. Practically the whole of South Europe and much of Central Europe; West Siberia, West Central Asia to Persia, Afghanistan, Kashmir, Garhwal, Sind, Rajputana and the Punjab. In Winter it has been found as far South as Pandharpur in the Bombay Presidency.

Nidification. The European Bee-eater breeds during May and June in the Himalayas from the Afghan Frontier and Quetta, through Kashmir to Garhwal at elevations of 5,000 feet upwards. It breeds in colonies, often of considerable size, in the banks of rivers and on the steeply sloping sides of hills. Where the soil is loose and sandy the burrows may be as long as five or six feet but where it is hard or clayey they are seldom more than four feet and sometimes less than two. The egg-chamber is large, about a foot across and, as a rule, there is a miscellaneous

collection of the chitinous parts and wings of the hymenoptera, upon which they feed, as a bed for the eggs. When not disturbed the same burrow may be used two or more years in succession. The eggs number five to eight, generally six and are, like all Bee-eater's eggs, pure white, glossy and hard-shelled with a fine, close texture but not very stout. In shape they are broad obtuse ovals or very spherical. One hundred Indian eggs average 26·6 × 22·4 mm.; maxima 28·7 × 23·1 and 26·7 × 23·8; minima 24·1 × 20·0 and 24·9 × 19·9 mm.

Col. K. Buchanan took two clutches of this Bee-eater's eggs which are quite well marked with dark inky spots at the larger end. Both birds assist in incubation, generally allowing themselves to be dug out before leaving their eggs or young.

Habits. In Winter the European Bee-eater is found over most of the North-West of India, but common apparently only in the North-West Provinces and the North-West of the Punjab. Whistler does not record it from the Jhang and Jhelum districts. It keeps invariably in flocks, large or small, hawking insects on the wing in most graceful flight, uttering a loud trill at intervals as it does so. It roosts in company on trees, bushes and sometimes even on reeds in swamps and river-sides. Its food consists of any kind of insects but very largely of bees and other hymenoptera.

Merops orientalis.

Key to Subspecies.

A. Darker.
  a. Head and neck only tinged with rufous . *M. o. orientalis*, p. 234.
  b. Upper part of head and neck wholly ferruginous ..... *M. o. birmanus*, p. 236.
B. Paler. Head and neck with merely a golden sheen ..... *M. o. biludschicus*, [p. 236.

(1523) Merops orientalis orientalis.

THE COMMON INDIAN BEE-EATER.

Merops orientalis Lath., Ind. Orn., Suppl., p. 33 (1801) (Mahratta, India).
Merops viridis. Blanf. & Oates, iii, p. 110 (part).

Vernacular names. *Patringa*, *Harrial* (Hind.); *Banspati* (Beng.); *Tai lingi*, *Veda-raghu* (Mahr.); *Chinna passeriki* (Tel.); *Kurumenne Kurulla* (Cing.); *Katalan Kuruvi* (Tamil, Ceylon).

Description. Whole upper plumage bright green, tinged with golden-rusty on the head, neck and upper back; innermost secondaries and rump brightest and often bluish, primaries and outer secondaries boldly tipped with black; elongated ends of central tail-feathers black and the lower aspect of the tail blackish; concealed portions of wing-quills blackish; chin, throat and

cheeks verditer-blue; fore-neck marked with a black gorget, generally faintly edged with blue above and below; under wing-coverts and axillaries and bases of inner web of wing-quills ferruginous; remainder of lower plumage bright pale grass-green, sometimes washed with blue on the abdomen and lower flanks.

Colours of soft parts. Iris blood-red or crimson; bill black; legs and feet dark plumbeous.

Measurements. Wing 85 to 95 mm.; central tail-feathers 107 to 125, outer 65 to 70 mm; tarsus 10 to 11 mm.; culmen 23 to 29 mm.

Distribution. Practically the whole of India and Ceylon, excluding Sind, Baluchistan and the extreme North-West Frontier. In Assam it is replaced by the next race.

Nidification. This Bee-eater breeds principally during April, sometimes in late March and at others in early May, over the whole of its range except in Ceylon, in which island they lay from April until August. The nest-hole varies in depth, according to the soil in which it is dug, from a foot or eighteen inches to some six feet. The first portion of the burrow is generally on a descending line, rising again before the egg-chamber is reached. Favourite places for breeding are low cliffs, roadside banks, artificial banks round gardens and cultivation or even borrow-pits from which road material has been taken. Often, however, it digs its home in almost level ground. There is no nest but sometimes when a burrow is used for more than one year, as is often the case, there is a considerable bed of insect-remains. The eggs number four to seven, generally six, and one hundred average 19·3 × 17·3: maxima **21·4 × 18·0** mm.; minima **17·6** × 16·0 and 18·8 × **15·8** mm.

Habits. This most elegant little bird is one of the most common and well-known birds of India, being found all over the plains and ascending the hills to some 6000 feet in the Nilgiris and hills of Southern India, to at least 5000 feet in the Himalayas but only up to about 1000 feet in Ceylon. Although not migrating in the true sense of the word, the Common Bee-eater moves about locally with considerable regularity, frequenting some areas during the dry breeding-season and others during the wetter months of the year. Its prey, which consists almost entirely of insects, may be caught as it circles round in graceful flight, or may be seized by quick sallies from some perch on tree or telegraph-wire. Occasionally it devours grasshoppers and small grubs, but it prefers the hymenoptera and where bees are kept it becomes a real pest in spite of its beauty and charm. Its call is a very sweet, long trill, constantly uttered on the wing and there is no more musical bird concert and few more beautiful bird sights than is given by a flock of these delightful little performers when hawking for insects over some lake or river. It frequents towns and villages as well as jungle country and desert plains and is a very bold, confiding little bird.

(1524) Merops orientalis birmanus.

THE BURMESE GREEN BEE-EATER.

Merops viridis birmanus Neumann, Orn. Monatsb., xviii, p. 80 (1910) (Myingyan, Upper Burma).
Merops viridis. Blanford & Oates, iii, p. 110 (part).

Vernacular names. *Monagyi* (Arakan); *Hnet-pasin-to* (Burm.); *Harial sorai* (Assam).

Description. Differs from true *orientalis* in having the upper head, neck and upper back ferruginous; the upper plumage is generally darker and the flanks more ferruginous.

Colours of soft parts as in the other races.

Measurements. Wing 93 to 99 mm.: central tail-feathers 111 to 133, outer 66 to 76 mm.; tarsus 10 to 11 mm.; culmen 24 to 30 mm.

Distribution. Assam, Burma, North and South Shan States, Siam, Yunnan, Cochin China and Annam.

Nidification. The Burmese Green Bee-eater breeds almost entirely in April throughout its range, a few birds commencing in the middle of March and others continuing up to the middle of May. Generally it breeds in company but single pairs often breed alone, whilst I found in Assam that disused borrow-pits alongside forest roads were a very favourite nesting-site, as a rule only one pair occupying each pit. Sometimes undoubtedly burrows are occupied for two or more years, for I have found very large accumulations of insect-remains in them forming a thick bed under the eggs. These latter number four to six, most often the latter, and forty average 19·2 × 17·0 mm.: maxima 20·9 × 17·9 mm.; minima 18·1 × 16·0 mm.

Habits. Those of the species but the race is more tolerant of rain and wet than either the common Indian or the Sind races. All forms are particularly fond of hawking for gnats and mosquitoes over rivers and lakes.

(1525) Merops orientalis biludschicus.

THE SIND GREEN BEE-EATER.

Merops viridis biludschicus Neumann, Orn. Monatsb., xviii, p. 80 (1910) (Sarbac, Persian Baluchistan).
Merops viridis. Blanf. & Oates, iii, p. 110 (part).

Vernacular names. *Nando-Traklo*, *Atedan* (Sind).

Description. A much paler bird than the Burmese or Indian forms; the head and upper back has merely a golden sheen rather than any tint of rufous.

Colours of soft parts as in the other races.

Measurements. Wing 89 to 98 mm.

Distribution. South-East Persia to Sind and Baluchistan; the Mekran coast to Fao and probably Southern Mesopotamia.

Nidification. Similar to that of the other races but the eggs are decidedly smaller. Fifty eggs average 18·8×16·3 mm.: maxima 20·0×17·2 and 19·1×17·4 mm.; minima 16·6×15·6 and 18·9×15·1 mm. The nesting-season is from March to mid-April in Sind but at Quetta eggs have been taken up to the third week in May. In many places in Sind Ticehurst says that it is not "colonial" but in some places near Karachi it breeds in colonies of considerable size in the sandy banks of nullahs.

Habits. Those of the species. Ticehurst says that they do not seem fond of hunting over "jheels" but Harington Bulkley records them as hawking for insects in vast numbers over swamps in the evenings.

Merops superciliosus.

Merops superciliosus Linn., Syst. Nat., 12th ed. i, p. 183 (1766).

Type-locality: Madagascar.

The typical form of this Bee-eater, which is found in Madagascar and a great part of Southern, Central and North Central Africa, differs principally from the Oriental forms *persicus, javanicus* and *philippinus* in its darker upper parts, paler lower parts and smaller size; the supercilium is very pale blue or white rather than verditer-blue and the chin and cheeks are white, or nearly so, instead of being yellow and verditer-green respectively. I can see no differences which can constitute a specific status between these forms and, as far as we know at present, in no cases do their breeding-ranges overlap.

Key to Subspecies.

A. Tail and rump blue more than green..... *M. s. javanicus*, p. 237.
B. Tail and rump green with no, or very little, tinge of blue ..... *M. s. persicus*, p. 239.

(1526) Merops superciliosus javanicus.

The Blue-tailed Bee-eater.

Merops javanicus Horsf., Trans. Linn. Soc., xiii, p. 171 (1821) (Java).
Merops philippinus. Blanf. & Oates, iii, p. 111.

Vernacular names. *Bara patringa* (Hind.); *Komu passeriki* (Tel.); *Hnet-pasin-to* (Burm.).

Description. A line next the bill, lores and a line under the eye through the ear-coverts black; below this a line of blue or verditer-green; a narrow supercilium from the bill to the upper ear-coverts verditer-green; upper plumage and wing-coverts green, the crown darkest, with a rufescent bronze tinge; this colour grades into bright verditer-blue on the rump and upper

tail-coverts; tail blue washed with green, the shafts and narrow prolongations of the central feathers black; primaries and outer secondaries like the back but often more rufescent, tipped with blackish, and often blue at the edge of the outer webs on the terminal portions; inner secondaries bluish; under surface of wing-quills broadly pale chestnut on the base of the inner webs; chin and fore-throat yellow; lower throat and upper breast deep chestnut, passing into green on the lower breast and into pale blue on the vent and under tail-coverts; axillaries and under wing-coverts pale chestnut.

Fig. 36.—Head of *M. s. javanicus.*

Colours of soft parts. Iris crimson, brown in the young; bill black; legs and feet dusky-plumbeous.

Measurements. Wing 121 to 135 mm.; central tail-feathers 126 to 145 mm., outer 84 to 86 mm.; tarsus 12 to 13 mm.; culmen 36 to 41 mm.

Young are paler and less vivid in coloration than the adults, especially on the throat and breast.

Distribution. Practically the whole of Ceylon and India, except Sind, to the foot-hills of the Himalayas, Burma and Malay Peninsula to Java. It seems almost certain that Doig wrongly identified his so-called specimens of *Merops phillipinus* which he thought he saw in Sind and that these were really *persicus.*

Nidification. The Blue-tailed Bee-eater breeds over nearly the whole of its range during April, making its nest-holes in the banks of rivers and streams. Where, however, it breeds away from water liable to monsoon floods, it often lays up to the middle of June. The tunnel is usually a long one, seldom less than four feet, whilst it has been recorded up to nine. The diameter of the tunnel is from 55 to 70 mm. and the egg-chamber about 150 to 200 mm. across by about 75 to 100 mm. high. The normal full clutch of eggs is six but they lay from four to seven. The average of 100 eggs is 23·2 × 20·1 mm.: maxima **25·1** × 19·6 and 22·5 × **21·3** mm.: minima **22·0** × 19·5 and 23·8 × **18·2** mm.

The parent birds sit very close and both sexes take part in incubation.

Habits. This Bee-eater is a bird of comparatively open country

and it is not found anywhere in heavy forest, though a few birds may be seen in the larger clearings in scrub and light deciduous growth, preferring well-wooded to desert or the most arid regions. They nearly always consort in flocks, sometimes of great size and two or more of these often roost together in the same place, whilst the breeding colonies occasionally number as many as a hundred pairs. They feed almost entirely on bees, wasps and other hymenoptera but any insect that passes within reach is taken. Their flight is extremely graceful and, at the same time, powerful and rapid, whilst from time to time as they wheel about they utter their pleasant, rippling call or whistle.

(1527) Merops superciliosus persicus.

THE BLUE-CHEEKED BEE-EATER.

Merops persica Pallas, Reis. versch. Russ. Reichs, ii, p. 708 (1773) (Caspian Sea).
Merops persicus. Blanf. & Oates, iii, p. 112.

Vernacular names. *Wado Traklo* (Sind.).

Description. Differs from *M. s. javanicus* in having the rump and upper tail-coverts green with no, or very little blue, upon them; the tail is bronze-green instead of blue; the upper and lower parts are almost free of any rufous tinge and the chestnut patch on the throat and breast is much smaller and paler; the white and blue-green cheek-patch is much larger and more conspicuous.

Colours of soft parts. Iris crimson, deep red or brown (females and young); bill black; legs and feet pale fleshy-plumbeous to dark brown.

Measurements. Wing 146 to 160 mm.; tail, central feathers 135 to 148 mm., outer 88 to 90 mm.; tarsus 11 to 12 mm.; culmen 35 to 44 mm. The female wing averages some 5 mm. less than that of the male but there is much overlapping.

Distribution. Breeding from the Caspian Sea to Sind, Punjab and Rajputana. It is extremely common over the greater part of Persia.

Nidification. In Persia the great majority of these Bee-eaters breed in June; in Mesopotamia Cox and Cheeseman found them laying during March. In Sind Doig thought it bred in July and August but Ticehurst says that he received a breeding bird in early May from Draklan, where it was said to breed in numbers on the canal-banks. Its nidification resembles that of the preceding bird. One hundred eggs average 26·2 × 20·9 mm.: maxima 27·1 × 20·8 and 24·3 × 22·6 mm.; minima 24·1 × 21 mm. and 26·3 × 20·0 mm. Five to seven is the normal full clutch.

Habits. The movements of the Persian Bee-eater are not well known. It has only been killed in India from early April to the end of October and once in December. Ticehurst, who saw them

in November in Sind, suggests that they migrate north by the "Arabian route" in April, returning in October. This Bee-eater is a bird of more desert country than the Blue-tailed Bee-eater but is not found in the quite waterless barren parts, keeping to the vicinity of canals, cultivation and more or less irrigated country. It may possibly merely migrate locally in Winter to the purely desert country, where of course no one sees it.

Genus **MELITTOPHAGUS**.

Melittophagus Boie, Isis, 1828, p. 316.

Type, *Melittophagus pusillus* Müller (Africa).

This genus differs from *Merops* only in not having the central tail-feathers prolonged beyond the others.

(1528) **Melittophagus erythrocephalus erythrocephalus.**

THE CHESTNUT-HEADED BEE-EATER.

Merops erythrocephalus Gmelin, Syst. Nat., i, p. 463 (1788) (India, Ceylon).
Melittophagus swinhoii. Blanf. & Oates, iii, p. 114.

Vernacular names. *Kurumenne Kurulla*, *Pook-kira* (Cing.).

Description. Lores, a narrow line on the forehead and a broad line under the eye and through the ear-coverts black; whole crown, hind-neck and back chestnut; interscapulars and scapulars bright dark green; rump, lower back and upper tail-coverts pale blue, the coverts darker and greener; tail green, the edges and tips of the lateral feathers tipped with blackish; primaries and outer secondaries tipped black, remainder of closed wing bright dark green; inner webs of quills rich rufous at the base, showing as a large patch below, concolorous with the axillaries and under wing-coverts; chin, throat and lower sides of neck pale yellow; a chestnut-brown gorget, bordered below with black, connected with the chestnut back; lower plumage pale green, divided from the black by an ill-defined yellow band and paler and more blue on the abdomen, vent and under tail-coverts.

Colours of soft parts. Iris crimson, dull pale brown in the young; bill black; legs and feet dark slaty to black.

Measurements. Wing 103 to 112 mm.; tail 71 to 83 mm.; tarsus 9 to 10 mm.; culmen 30 to 34 mm.

Young birds have the head concolorous with the lower back and the rufous of the back much mixed with green; the rufous and black collars are ill-defined.

Distribution. Ceylon, the West coast of India, North to Belgaum; Himalayan Terai from Dehra Dun to Eastern Assam; Eastern Bengal and Orissa (Godavery, *Blanford*), Burma, Andamans, Malay Peninsula and Indo-Chinese countries to Annam and Yunnan.

Nidification. The Chestnut-headed Bee-eaters breed in the Himalayan Terai and Assam in April and occasionally in May, making their tunnels either in the banks of the rivers running through a forest or digging them out in the almost level sand-flats. The tunnels are generally of considerable length, 4 to 6 feet, sometimes up to 10 feet, but when made in clay soil only a few inches. The chamber is about 8 by 6 inches, rather large in comparison with the size of the bird; there is no lining and hardly ever any debris of insect-remains; the diameter of the tunnel is barely 2 inches. When the first nests are flooded out, a not unusual occurrence, the birds desert the rivers and breed in banks of nullahs and ravines in forest and eggs may be taken from these nests up to the end of June. They do not breed in colonies, though many pairs may be found breeding in suitable stretches of river about a hundred yards, or less, apart. They are close-sitters and at night both birds occupy the egg-chamber.

On the Malabar coast these Bee-eaters lay principally in February and March.

Two hundred eggs average 21·7 × 19·0 mm.: maxima 23·4 × 20·1 mm.; minima 20·1 × 19·0 and 20·3 × 17·9 mm.

Habits. The Chestnut-headed Bee-eaters always feed in company and during the non-breeding season remain in flocks numbering anything from a dozen to a hundred individuals. Their food is captured entirely on the wing and their evolutions in the air are extremely beautiful, accompanied by a most musical trill, uttered every few minutes. They feed on any kind of insects and I have seen them taking food of some kind, probably mosquito eggs and larvæ, from small stagnant pools left by a stream drying up. They are amongst the earliest bird risers and their pleasant notes may be heard almost with the first glimmer of light in the morning, especially if their roosting-place is one among the tall reeds on a river-bank.

Genus **BUCIA**.

Bucia Hodgs., J. A. S. B., v, p. 360 (1836).

Type, *Nyctiornis amicta* Temm.

The generic name *Nyctiornis* Swainson, Zool. Illustr., ii, pl. 56 (1831) is preoccupied by Nitzsch (1829) and cannot therefore be used.

In this genus the feathers of the throat and centre of the breast are greatly lengthened and brightly coloured; the bill is stronger and deeper than in either of the preceding genera; the ridge of the culmen is flattened with a hollow on either side; the nostrils are covered with plumes; the wings are long, the first quill about two-thirds the third, which is longest; the tail is long and slightly graduated.

Key to Species.

A. Long feathers of throat and breast blue ..... *B. athertoni*, p. 242.
B. Long feathers of throat and breast scarlet .... *B. amicta*, p. 243.

(1529) Bucia athertoni.

THE BLUE-BEARDED BEE-EATER.

Merops athertoni Jard. & Selby, Ill. Orn., ii, pl. 58 (1829) (India, near Bangalore *).
Nyctiornis athertoni. Blanf. & Oates, iii, p. 115.

Vernacular names. *Bukay-chera* (Nepal); *Sang-rhyok* (Lepcha); *Pya-too-hnet* (Burma); *Dao-hukuru* (Cachari).

Fig. 37.—Head of *B. athertoni.*

Description. Forehead and generally the fore-crown verditer-blue, changing into bright grass-green on the whole upper plumage, including the entire visible portions of the wing; whole under surface of tail and basal inner webs of upper surface ochraceous-buff, the tips and edges of the outer webs dusky; sides of head, neck and throat like the back; centre feathers of chin, throat and fore-neck brilliant pale blue, the feathers centred with dark blue, which shows up boldly on the longest feathers; remainder of lower plumage dark ochre-yellow, streaked with green on the breast, flanks and upper abdomen.

Colours of soft parts. Iris bright brown, reddish-brown or deep red; bill dark horny, the extreme tip pale and transparent whitish; base of lower mandible pale horny; legs purplish-green or dull purplish-brown.

Measurements. Wing 128 to 141 mm.; tail 120 to 138 mm.; tarsus 16 to 17 mm.; culmen 37 to 45 mm.

Distribution. The West coast of India from Travancore to Belgaum; Sambalpur; Lower Himalayas from Dehra Dun to East

* I originally designated Cachar as the type-locality but it appears that Atherton sent the type to Selby together with a collection of birds, *Passer* etc., which came from the West coast of India and his specimens of *B. athertoni* were therefore probably obtained somewhere near Bangalore.

and South Assam; Eastern Bengal in Tippera and Chittagong; Manipur, Lushai Hills, Burma South to Tenasserim, Siam.

Nidification. Like all other Bee-eaters, this magnificent bird lays its eggs in tunnels in banks cut out by themselves and the favourite site appears to be the side banks of bridle-paths and jungle-tracks through deep forest. Probably April and May are the principal breeding months but I have taken eggs from February to August. Bingham found eggs in April in Tenasserim, whilst Davidson took them during March in Kanara. They are very difficult to find, as the birds seem to employ their spare time throughout the year in making burrows but those which contain eggs or young always have a mass of insect debris in the chamber, remnants of which generally show from outside. The eggs number four to six and are indistinguishable from those of the Common White-breasted Kingfisher. Thirty eggs average 30·0 × 28·0 mm.: maxima **32·9** × 27·8 and 32·3 × **29·0** mm.; minima **28·5** × 26·3 and 29·0 × **25·4** mm. They have a good gloss when fresh and are hard and close in texture but, like most white eggs, become yellowish in time.

Habits. The Blue-throated Bee-eater is entirely a forest bird and is found throughout the broken country at the foot of the hills up to some 5000 feet, keeping either singly or in pairs to the tops of the tallest trees. It feeds but little on the wing but searches the leaves and flowers for insects and honey; I also once shot a bird as it flew from a hollow in a dead tree which had its stomach full of wood-lice and wood-boring insects. A favourite feeding-ground is the Cotton-tree when in flower, four or five pairs sometimes frequenting the same tree, the great red flowers of which attract immense quantities of insects. The note of this bird is a very harsh double croak, ending in a chuckle. The first note is uttered by the bird with the head held low and the long blue feathers of the throat puffed out; with each succeeding note the head is raised, the last note being sounded with the head pointing straight up. The flight is powerful but less graceful than that of most Bee-eaters, whilst their movements clambering about on the tree-tops are awkward and slow.

(1530) **Bucia amicta.**

THE RED-BEARDED BEE-EATER.

Merops amictus Temm., Pl. Col., iv, pl. 310 (1824) (Bencoolen, Sumatra).
Nyctiornis amictus. Blanf. & Oates, iii, p. 117.

Vernacular names. None recorded.

Description.—Male. Feathers immediately surrounding the bill verditer-green; lores and forehead deep plum-pink, passing into lilac on the vertex and then into the bright grass-green of the upper plumage, wings, sides of the head, neck and breast; lateral tail-feathers with the terminal edge of the inner webs black and the

basal two-thirds ochre-yellow ; lower surface of tail-feathers bright yellow-ochre with broad black tips and blackish edges to the outer webs ; concealed portions of quills and tips of primaries blackish, a ring round the eye dark green ; throat, cheeks, centre of fore-neck and extreme upper breast scarlet, the feathers of the last with black centres, showing in less or greater degree ; remainder of lower parts pale green ; axillaries and under wing-coverts ochre-yellow.

Colours of soft parts. Iris bright yellow to deep orange ; bill black, pale slaty at the base ; legs and feet pale to dark dull green or slaty-blue ; claws black.

Measurements. Wing 126 to 134 mm. ; tail 105 to 114 mm. ; tarsus 16 to 17 mm. ; culmen 38 to 48 mm.

Female similar to the male but has the lores and forehead scarlet, concolorous with the throat.

Young birds have no red or pink colour and are green throughout, the tail like the adult but very dull, and the abdomen darker and yellowish.

Distribution. Tenasserim South to Sumatra and Borneo ; peninsular Siam.

Nidification. Mr. W. A. T. Kellow seems to be the only collector who has taken the eggs of this bird. Three clutches were found by him in February laid in tunnels about four feet deep made in the banks of small streams running through dense evergreen forests in the vicinity of Taiping, near Perak, in the Federated Malay States. The thirteen eggs, 5, 5 and 3, obtained by him averaged 28·8 × 24·9 mm. : maxima **30·5** × 26·3 mm. and 29·0 × **27·0** mm. ; minima **28·0** × 23·6 and 28·9 × **23·2** mm.

Habits. So far as are known the same as those of *B. athertoni.*

31 Ke...

Family ALCEDINIDÆ.

The *Alcedinidæ* differ from the *Meropidæ* in many important characters. Both carotids are present; the sternum has four notches on the posterior margin and the manubrium sterni is simple, composed of the spina externa only; generally the two plantar tendons are united but the slip leading to the hallux branches off from the *flexor perforans digitorum* above the junction as in the *Meropidæ*; in some non-Indian genera this slip unites with the *flexor longus hallucis* and the latter runs to the fourth digit only, having no other connection with the *flexor p. digitorum*. The wing is diastataxic, cæca are present and the oil-gland is tufted. The spinal feather-tract is well defined on the neck and not divided on the back, whilst down is present on those parts not covered by the tracts, a character peculiar to the Kingfishers.

Fig. 38.—Right foot of *A. a. bengalensis*. ½.

In this family the bill is long, stout and pointed, with a round or slightly flattened culmen; the line straight and not curved as in the *Meropidæ*; the feet and tarsi are feeble; the fourth, or outer toe, is united to the third for more than half its length and the second and third toes are only united for the basal third.

Primaries eleven, the first very small; tail-feathers ten in all but *Tanysiptera*, which has twelve.

Key to Genera.

A. Plumage black and white (Indian species) ..... CERYLE, p. 246.
B. Plumage not black and white.
  a. Tail shorter than culmen.
    a'. Toes four ..... ALCEDO, p. 249.
    b'. Toes three ..... CEYX, p. 260.
  b. Tail longer than culmen.
    c'. Sexes alike.
      a''. Bill red.
        a^3. Bill compressed, culmen flattened and grooved on either side.... RAMPHALCYON, p. 262.
        b^3. Bill not compressed, culmen rounded and not grooved.
          a^4. Primaries white at base .... HALCYON, p. 267.
          b^4. No white on primaries..... ENTOMOTHERA, p. 272.
      b''. Bill black ..... SAUROPATIS, p. 274.

d'. Sexes not alike.
c''. Bill black above; plumage not barred ..... CARIDAGRUS, p. 278.
d''. Bill red throughout; plumage barred ..... CARCINEUTES, p. 279.

Genus CERYLE.

Ceryle Boie, Isis, 1828, p. 316.

Type, *Ceryle rudis* Linn.

In this genus the bill is long and compressed, the culmen slightly curved, flattened or rounded above, with a groove on each side; the wings are rather pointed with first primary little shorter than the second and either the second or third the longest; the tail is longer than the culmen.

The plumage of the Indian races is black and white.

Key to Species.

A. Back not barred; wing under 150 mm. ..... *C. rudis*, p. 246.
B. Back with transverse bars; wing over 160 mm.. *C. lugubris*, p. 248.

Ceryle rudis.

Alcedo rudis Linn. Syst. Nat., 10th ed., i, p. 116 (1758).

Type-locality: Persia.

The typical form, *C. rudis rudis*, which is found in Africa, extending to Persia, Palestine and Mesopotamia, differs from the Indian bird in having the base of the tail-feathers mottled black and white instead of pure white. It is very likely to occur in Sind and on the Mekran coast.

(1531) Ceryle rudis leucomelanura.

THE INDIAN PIED KINGFISHER.

Ceryle leucomelanura Reichenb., Handb., Alced., p. 21 (1851) (Ceylon).
Ceryle varia. Blanf. & Oates, iii, p. 119.

Vernacular names. *Koryala-Kilkila* (Hind.); *Phatka Machranga*, *Karikata* (Beng.); *Ung-ta-brik* (Lepcha); *Pelihuduwa Waturanuwa*, *Gomera Pelihuduwa* (Cing.); *Pane-nyin*, *Budaunen-jo* (Burm.); *Inrui-gna* (Kacha Naga); *Dao-natu-meberang* (Cachari).

Description.—Male. Feathers round the eye black; lores and long supercilium white; forehead, crown and nuchal crest black, finely streaked with white; a white collar, broad on the sides of the neck, narrower and generally broken with a few black streaks in the hind-neck; back, scapulars and wing-coverts black with white tips and white bars and notches; upper tail-coverts and rump white with large terminal black spots; tail black with white tips

and white basal halves; primaries black with very fine white tips and a broad band of white across the bases; outer secondaries the same but with no white band on the outer webs; inner secondaries barred black and white; a black line through the eye and ear-coverts, more or less streaked with white; lower plumage white; the sides of the neck always and the centre often marked with black streaks and spots; two black gorgets across the breast, the upper broad and often with white fringes to the feathers on the centre, the lower narrow; a patch of bold black spots on either flank.

Fig. 39.—Head of *C. r. leucomelanura*.

Colours of soft parts. Iris hazel; bill, legs and feet black, the latter occasionally tinged with grey or plumbeous and the sides yellowish.

Measurements. Wing 128 to 145 mm.; tail 68 to 75 mm.; tarsus about 10 to 11 mm.; culmen 53 to 63 mm.

Females have less black on the lower plumage, the second gorget is wanting and the upper is generally broken with white in the centre; the neck- and flank-spots are also fewer.

Distribution. Ceylon and the whole of India, North to Baluchistan and Kashmir, Burma South to Tenasserim as far as Amherst; East to Yunnan, the Indo-Chinese countries and South China.

Nidification. The Common Pied Kingfisher breeds throughout its range during the Cold Weather months from October up to the end of April, frequently rearing two broods. Occasionally they must lay even before the rains cease, as Cripps found full-grown young on the 29th October and Hume obtained young ones ready to fly on the 30th. The nest-hole is almost invariably made in river-banks varying in depth from two to six feet according to the soil. Marshall once found three pairs breeding in a hollow about two feet across led to by a single tunnel. The eggs, four or five, rarely six, are laid on the bare sand. One hundred eggs average 29·9 × 24·1 mm.: maxima **32·0** × 24·0 mm. and 30·2 × **25·1** mm.; minima **27·9** × 23·8 and 30·9 × **23·0** mm. They are, of course, like all other Kingfishers' eggs pure white, with a glossy hard surface and fine texture. In shape they are much less round than

most Kingfishers' eggs are; some few are rather long ovals with the smaller end quite well differentiated from the larger.

Habits. The Pied Kingfisher may be found in any open country where there is water, for it fishes alike in the huge tidal rivers of Bengal, tanks, canals and even roadside ditches. Its food is entirely aquatic and principally small fishes, though it will also eat water-insects, tadpoles, tiny prawns or very small frogs. Unlike most Kingfishers, which dive after fish from some fixed perch, this bird hovers in the air ten to thirty feet above the water and then takes its plunge after its prey, often disappearing quite below the surface. Its note, a pleasant chirrup, is constantly uttered on the wing and when, as is sometimes the case, its interrupted meal takes flight, as it drops it will twist up in the middle of its dive, uttering a louder and more querulous note than usual. In the Sunderbunds it may be seen on the shores of the rivers where the water is salt and runs through forest and it is said also to occur on the seashore. It is a very confiding bird and does not seem to resent being watched.

Ceryle lugubris.

Alcedo lugubris Temm., Pl. Col., 548 (1834).

Type-locality: Japan.

The typical bird is paler than that found in India and the adjoining countries.

(1532) Ceryle lugubris guttulata.

THE HIMALAYAN PIED KINGFISHER.

Ceryle guttulata Stejneger, Proc. U.S. Nat. Mus., xv, p. 294 (1893) (India, Cachar).
Ceryle lugubris. Blanf. & Oates, iii, p. 121.

Vernacular names. *Machi Bagh* (Hind., Dun); *Jel butara* (Chamba); *Ung-ka-zhu* (Lepcha); *Dao-natu meberang-gadeba* (Cachari).

Description.—Male. Lores, under the eye and upper part of the head and crest black with elongated white oval spots, becoming streaks on the ear-coverts; cheeks, back and sides of the neck white, forming a broad nuchal semi-collar; remainder of upper plumage, wings and tail blackish-grey barred with white, the dark parts darker on the quills than elsewhere; two streaks of black diverging from the point of the chin, running either side of throat and neck and merging in a broad pectoral band of black spots mixed with rufous-brown; in many cases the black spots on the sides of the neck are also mixed with rufous; flanks and sides of abdomen barred with blackish; axillaries white streaked with black; remaining underparts and under wing-coverts white, the longer under tail-coverts barred with black.

Colours of soft parts. Iris dark brown or black; bill horny greenish-brown, blackish toward the tip; legs and feet olive or greenish-plumbeous.

Measurements. Wing 183 to 191 mm.; tail 105 to 112 mm.; tarsus about 12 to 13 mm.; culmen 56 to 69 mm.

Female differs from the male in having the wing-coverts and axillaries pale rufous-brown.

Young birds are like the female.

Distribution. Himalayas from Kashmir to Assam, Burma from the North to Amherst in Tenasserim. Eastwards Forrest obtained it in Yunnan.

Nidification. The Himalayan Pied Kingfisher breeds in the sub-Himalayas from the foot-hills up to about 3,000 feet in Assam and between about 2,000 and 7,000 feet in Kumaon and Kashmir. The nest-tunnel seems generally to be short and the egg-chamber large, sometimes as much as a foot across each way. The eggs number three to five, twenty of them averaging 38·5 × 32·5 mm.: maxima **39·4** × 31·6 and 39·0 × **35·0** mm.; minima **37·3** × **30·1** mm. The breeding-season is from March to early May, occasionally as late as June, possibly when the first brood is destroyed by flood. The nest-hole is nearly always made in banks of small streams; at other times it may be found in ravines just off the streams themselves and occasionally in banks in forest.

Habits. These grand Kingfishers are very common in the Assam Hills but owing to their crepuscular habits and their love of shade and cover, they are not often seen. They are silent birds but have a harsh, shrill call of the usual Kingfisher character and a deep croak, used as a call between the two birds of a pair. They dive for fish from low bushes and very seldom hover in the air like their smaller relations and for the greater part of the day they sit, squatted and humped up, on a branch of some low, thick bush, just over the water, in much the same way as does the little Green Bittern. They feed, apparently, entirely on fish and their flight is very powerful and, though usually rather deliberate, they are capable of great speed.

Genus **ALCEDO.**

Alcedo Linn., Syst. Nat., 10th ed., i, p. 115 (1758).

Type, *Alcedo ispida* Linn. = *A. atthis ispida.*

In this genus the bill is long and compressed; the culmen very slightly curved, with the ridge rounded, not flattened, above and with a slight groove on either side; the wing is long and pointed; the first primary long, and the third or fourth longest; the tail is shorter than the bill and rounded; the feet are very weak.

The plumage of the genus is never pied black and white as in *Ceryle* but has always much green or blue on the upper parts.

Key to Species.

A. Size small, wing under 80 mm.
  a. Ear-coverts ferruginous in adults ..... *A. atthis*, p. 250.
  b. Ear-coverts blue in adults ..... *A. meninting*, p. 253.
B. Size large, wing over 80 mm.
  c. No green band across breast.
    a'. Bars on head conspicuous, whitish-blue ..... *A. hercules*, p. 258.
    b'. Bars on head inconspicuous, dull greenish-blue ..... *A. euryzona*, ♀, p. 259.
  d. A green band across breast ..... *A. euryzona*, ♂, p. 259.

Alcedo atthis.

Gracula atthis Linn., Syst. Nat., 10th ed., i, p. 109 (1758).

Type-locality: Egypt.

The typical form is smaller than the European one but larger than any of those found in Indian limits.

Key to Subspecies.

A. Largest and palest, with tone of upper plumage less blue, more green ..... *A. a. pallasii*, p. 253.
B. Smallest and darkest; upper parts very richly blue, less green ..... *A. a. taprobana*, p. 252.
C. Intermediate in all respects, but nearer to *pallasii* than *taprobana* on upper parts.. *A. a. bengalensis*, p. 250.

(1533) Alcedo atthis bengalensis.

THE COMMON INDIAN KINGFISHER.

Alcedo bengalensis Gmelin, Syst. Nat., i, p. 450 (1788) (Bengal).
Alcedo ispida. Blanf. & Oates, iii, p. 122.

Vernacular names. *Chota kilkila*, *Nika* or *Nita Machrála* (Hind.); *Khandú*, *Khandya* (Mahr.); *Chota Mashranga* (Beng.); *Ung-chin* (Lepcha); *Dane-nyin* (Burma); *Dao-natu-kashiba* (Cachari).

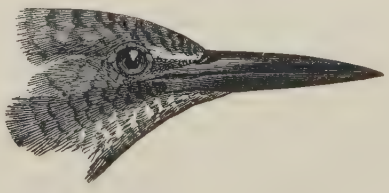

Fig. 40.—Head of *A. a. bengalensis*. ⅔.

Description. Forehead to hind-neck barred bluish-black and pale blue; back, rump and upper tail-coverts brilliant smalt-blue, often a little deeper on the upper tail-coverts; scapulars and tail-

coverts greenish-blue, all but the primary coverts tipped with a spot of bright blue, obsolete or absent on the scapulars; quills blackish, edged with greenish and the innermost secondaries all of this colour; tail dusky blue above, dark brown below; lores and a line through the eye black; sides of the forehead, upper cheeks and ear-coverts ferruginous; a broad streak from the lower mandible to the sides of the neck greenish-blue; chin and throat white; sides of breast blue-green; remaining underparts deep ferruginous.

Individual variation in this and the other races is very great, more especially in the depth of colouring, both on the blue parts and on the ferruginous underparts.

Colours of soft parts. Iris hazel-brown; bill black, the base of the lower mandible paler reddish or orange in young males and females; legs and feet coral-red.

Measurements. Wing 68 to 74 mm.; tail 31 to 32 mm.; tarsus about 9 mm.; culmen 34 to 40 mm.

Young birds are much duller than the adult, even in their first breeding-season, especially on the wing, scapulars and the blue-black of the head, all of which parts are more green and less blue than in the fully-plumaged birds; young of the year are duller and more ochre below and have the breast much suffused with brownish-ashy, this colour sometimes forming a fairly definite band, well defined against the white or orange-white throat.

Distribution. Bengal, Assam, North, Central and South Burma; Shan States, Yunnan and East through Indo-China to Japan and Corea. South it extends to the Philippines and through the Malay Peninsula to Sumatra and Borneo, though from South Tenasserim birds seem to become rather duller, more green and less blue; in India it extends to Orissa, West Bengal, Bihar and the Bhutan Duars and South to the drier parts of the Deccan and perhaps into the North-East Central Provinces; the birds from Nepal and Sikkim are of this race, though those of the highest ranges may prove to be *pallasii* and it appears to extend West to Sind and to the Himalayan Terai of the Garhwal Hills and Kuman.

Nidification. This little Kingfisher breeds in the lower hills in May and June but in the plains from March until May; a few birds only in early June. They cut out their tunnels and egg-chambers in the banks of streams and rivers, tanks and ditches but prefer running to stagnant water. The tunnels are generally short, from one to four feet and the egg-chamber may measure anything from five to seven inches either way. After the digging has been completed a mass of fish- and insect-debris soon collects and smells strongly, the birds disgorging the undigested fish-bones, elytra, etc. The eggs number five to seven, rarely eight and are the usual white, round, highly-glossed eggs typical of this family. Forty eggs average 20·9 × 17·6 mm.: maxima 22·4 × 17·3 and 22·0 × 19·0 mm.; minima 19·9 × 17·0 mm.

The parent birds sit close and may occasionally be caught on the nest but they are not invariably bold as the Bee-eaters are.

Habits. The Common Indian Kingfisher may be found wherever there is ample water to contain its fish- and insect-food. This it captures from a perch on some bush, stump or convenient stone, plunging therefrom into the water and generally returning to the same perch to devour its catch. Its flight is very swift and straight, with a peculiar trick of bending from side to side so that at one moment in the sun the whole bird appears a gleaming blue and the next in the shade it appears wholly black. The call is a loud, trilling whistle, generally uttered when in flight but sometimes, especially in the breeding-season, when seated. Each pair of birds takes up more or less permanent possession of a certain reach of river, a tank or a ditch and drive all other Kingfishers away, being very bold and fierce in the protection of their private areas.

(1534) Alcedo atthis taprobana.

THE COMMON CEYLON KINGFISHER.

Alcedo atthis var. *taprobana* Kleinschm., Orn. Monatsb., ii, p. 126 (1894) (Ceylon).
Alcedo ispida. Blanf. & Oates, iii, p. 122 (part).

Vernacular names. *Nila-buche-gadu* (Tel.).

Description. Similar to the preceding bird but much richer in coloration, the upper parts are a richer, deeper blue; the scapulars and wing-coverts are more blue and less green than they are in that race and the lower parts are generally a deeper ferruginous.

Colours of soft parts as in *A. a. atthis.*

Measurements. Wing 69 to 73 mm.; tail 30 to 34 mm.; tarsus about 9 mm.; culmen 33 to 40 mm.

Distribution. Ceylon and South India as far North as Bombay, Poona, Mt. Aboo, where, strange to say, we have most richly-coloured specimens, Ahmedabad, Central Provinces and South Orissa. Birds in the Northern Deccan and Central Provinces are, as one would expect, intermediate and form the meeting-ground of all three races.

Nidification. Similar to that of the previous race but breeds more often in dense forest and is said to be common on tanks in Ceylon far from other water or open ground. In this island also it seems to breed almost all the year round for Wait, Phillips and others have seen eggs in almost every month. In South India it breeds in March and April, but Barnes found eggs in the Satpuras in February and Butler took eggs ready to hatch in Belgaum on the 22nd August, the parents at once starting another nest close by. Forty-eight eggs average 20·4 × 17·2 mm.

maxima **21·6** × 17·9 and 20·6 × **18·4** mm.; minima **19·1** × **15·8** mm. The eggs number three to five in a clutch.

Habits. Those of the species.

(1535) Alcedo atthis pallasii.

THE COMMON CENTRAL ASIAN KINGFISHER.

Alcedo pallasii Reichenb., Handb., Alced., p. 3 (1851) (West Siberia).
Alcedo ispida. Blanf. & Oates, iii, p. 122 (part).

Vernacular names. *Chota kilkila*, *Nita* or *Nika machrala* (Hind.); *Tint-kennu*, *Tuntu* (Kashmiri).

Description. A much paler bird than *A. a. bengalensis* and *a fortiori* than *A. a. taprobana.* The blue of the back and rump is very pale; the colour of the wings, especially of the scapulars, is duller and more green, whilst the head is barred dull brownish and pale greenish-blue.

Colours of soft parts as in the other races.

Measurements. Wing 70 to 78 mm.; tail 31 to 38 mm.; tarsus about 9 mm.; culmen 34 to 41 mm.

Distribution. West Siberia, Turkestan, Transcaspia, Persia to Afghanistan, Baluchistan, Sind, Kashmir and the Punjab. Birds of the United Provinces, North Central Provinces and Western Bihar are intermediate between *pallasii* and *bengalensis*, many individuals being definitely referable to either one or the other whilst in Winter the two forms are found together.

Nidification. Similar to that of the other races. In the Himalayas I doubt if it breeds below 5,000 feet, all the lower hills and Terai specimens which I have seen being nearer *bengalensis.* The breeding-season is April and May in the lower ranges and May and June in the higher. The birds lay from five to eight eggs, forty of which average 21·1 × 17·8 mm.: maxima **22·5** × 18·0 and 19·3 × **18·4** mm.; minima **19·5** × 18·4 and 20·2 × **17·1** mm.

Habits. Those of the species; it has been observed as high as 12,000 and 14,000 feet in Summer and in Winter is very common in Sind, the Punjab and North-West Frontier Province, extending as far East as Bihar.

Alcedo meninting.

Key to Subspecies.

A. Bars of forehead and crown deep purple-blue with no green tinge.
  a. Spots on wing inconspicuous or absent . *A. m. meninting*, p. 254.
  b. Spots on wing-coverts large and conspicuous ..... *A. m. phillipsi*, p. 255.

B. Bars of forehead and anterior crown always tinged with greenish.
  c. Darker and deeper blue above ..... *A. m. scintillans*, p. 255.
  d. Paler above.
    a'. Larger, wing 69 mm. or over ..... *A. m. asiatica*, p. 256.
    b'. Smaller, wing 68 mm. or under .... *A. m. coltarti*, p. 256.
C. Greenish tinge of blue on head extending to upper back ..... *A. m. rufigastra*, p. 257.

(1536) Alcedo meninting meninting.

THE MALAY BLUE-EARED KINGFISHER.

Alcedo meninting Horsf., Trans. Linn. Soc., xiii, p. 172 (1821) (Java); Blanf. & Oates, iii, p. 125.

Vernacular names. The races of *A. meninting* are never distinguished from those of *A. atthis*.

Description.—Male. Lores and a very fine line at the base of the bill black; sides of the forehead rufous; centre of forehead, crown to nape, ear-coverts and sides of head deep purple-blue, the crown and hind-neck barred with velvety black; upper back, rump and upper tail-coverts brilliant blue, darkest on the coverts; tail black, tinged with blue; scapulars and wing-coverts black, overlain with purple-blue and the latter with deep blue tips which are very small and inconspicuous; quills black, the secondaries edged with purple-blue and the innermost nearly all of this colour; the inner webs edged with rufous, showing on the under surface; a long oval patch of white or pale rufous on either side of the neck; chin and throat rufescent or buffy-white; remainder of lower parts deep ferruginous.

Colours of soft parts. Iris dark brown; bill black, fleshy or orange-red at the base and gape; legs and feet coral-red.

Measurements. Wing 60 to 68 mm., average 63·5 mm.; tail 25 to 27 mm.; tarsus about 8 mm.; culmen 34 to 40 mm.

Female. Differs only in having much of the bill reddish toward the base. Very old females are not distinguishable from the male.

Young birds have the ear-coverts and cheeks rufous, sometimes with a blue line under them; the bill is reddish with a whitish tip.

Distribution. Celebes, Java, Sumatra, Borneo, Palawan, Malay States, North to Tenasserim. Two or three specimens from as far North as Bankasoon must be referred to this race, though the typical form from Tenasserim is *scintillans*.

Specimens from Batu, Sulu Is., Pelong, Bangka, Bangai, Billiton and Bali all seem inseparable from the typical form. The name *cærulescens* which I used for this bird in my catalogue appears to refer rather to *A. beryllina* than to the present form.

Nidification. The Blue-cheeked Kingfishers keep much to small streams in dense forests, making their nest-holes in banks

just above the running water. A pair of eggs sent to me with the skin of one of the parent-birds were taken on the 14th March and measure 20·0 × 17·0 and 19·7 × 16·9 mm. Other eggs taken in March and May are much larger and the layer may not have been correctly identified.

Habits. Generally speaking the habits of this species do not differ from those of the Common Indian Kingfisher except that the birds are never found in open country but keep to waters running through deeply-shaded evergreen forest. Voice, flight, and diet are the same but the last may be more exclusively fish.

(1537) Alcedo meninting phillipsi.

THE CEYLON BLUE-EARED KINGFISHER.

Alcedo meninting phillipsi Stuart Baker, Bull. B. O. C., xlvii, p. 72 (1927) (Ceylon).
Alcedo beavani. Blanf. & Oates, iii, p. 124 (part).

Vernacular names. *Mal-pilihudwā* (Cing.); *Min-kotti* (Tam.).

Description. Similar to *A. m. meninting* but with the wing-coverts boldly spotted with deep blue and the lower plumage rather darker.

Colours of soft parts as in the preceding bird.

Measurements. Wing 65 to 71 mm.; bill 35 to 48 mm. In nearly all the wing is over 67 and the bill over 40 mm.

Distribution. Ceylon and South Travancore; Pottianore, Madras. There are only four specimens of this race in the British Museum collection but there also are nine beautiful specimens in the Tring Museum and these all vary so startlingly from their nearest neighbour, *A. m. asiatica*, that they cannot possibly be confounded with it. They are very close to true *meninting* but all thirteen specimens have the wings well spotted, a character not visible in any one of the long series of the typical form in the same collection.

Nidification. The only nest of which I have record is one taken by Stewart in January in Travancore containing six eggs measuring 20·7 × 17·1 mm.

Habits. Those of the species.

(1538) Alcedo meninting scintillans.

THE TENASSERIM BLUE-EARED KINGFISHER.

Alcedo meninting scintillans Stuart Baker, Bull. B. O. C., xxxix, p. 38 (1919) (Bankasoon).
Alcedo meninting. Blanf. & Oates, iii, p. 125 (part).

Vernacular names. None recorded.

Description. Similar to *A. m. meninting* but not nearly so deep a blue either on the dark or light parts; the bars of the fore-

crown are tinged with green and the scapulars are nearly always black in the adult as in the young.

Colours of soft parts the same in all the races.

Measurements. Wing 62 to 66 mm.; culmen 35·0 to 38·5 mm.

Distribution. Peninsular Burma and Siam between latitudes 10° and 16°. Specimens to some distance North and South of this are intermediate and vary greatly individually.

Nidification. Hopwood found this bird breeding in Tenasserim and took three eggs from a nest-hole burrowed in the bank of a stream in deep forest running into the Tharrawaddy River. The eggs are very large, almost certainly abnormally so, measuring about 22·9 × 19·4 mm. They were taken on the 15th April. Oates took four eggs from a tunnel made in the bank of a ravine in Pegu on the 2nd July.

Habits. Those of the species.

(1539) Alcedo meninting asiatica.

BEAVAN'S KINGFISHER.

Alcedo asiatica Swains., Zool. Ill., 1st series, i, pl. 50 (1821) ("Some part of India," Manbhum, Bengal).
Alcedo beavani. Blanf. & Oates, iii, p. 124 (part).

Vernacular names. None recorded.

Description. The palest of all the races; the black scapulars overlain with deep green-blue; the spots on the wing-coverts large, very blue and conspicuous. This is also the largest of all the races.

Measurements. Wing 69 to 74 mm.; culmen 37 to 41 mm.

Distribution. Bengal, Cuttack in Orissa and Belgaum South down the Malabar coast. Specimens I have had sent me from Travancore, except from the extreme South, seem referable to this race rather than to the Ceylon form. More material is badly required of this little Kingfisher and might possibly greatly modify present conclusions.

Nidification. Not recorded.

Habits. Those of the species.

(1540) Alcedo meninting coltarti.

THE ASSAM BLUE-EARED KINGFISHER.

Alcedo meninting coltarti Stuart Baker, Bull. B. O. C., xxxix, p. 39 (1919) (Saddya, Assam).
Alcedo beavani. Blanf. & Oates, iii, p. 124 (part).

Vernacular names. None recorded.

Description. Very close to *A. m. asiatica* but besides being smaller is more green, less blue; the bars of the head and

crown are all greenish; the greater wing-coverts and innermost secondaries are very green; the spots on the lesser and median wing-coverts are small but very bright and conspicuous.

Measurements. Wing 62 to 69 mm.; bill 33 to 39 mm.

Distribution. Sikkim, Bhutan, Assam, Burma as far South as latitude 16°; Shan States, North and Central Siam and Cochin China.

Nidification. This is a common breeding bird throughout Assam and the well-wooded, wetter parts of North and Central Burma, being found both in the heaviest evergreen forest and in lighter forest in which there are deep ravines with thickly-wooded sides. The breeding-season commences in April and continues until August but most birds seem to breed after the rains begin in the middle of June. The nesting-burrow is generally made high up above the water, to allow for floods, and is deep, measuring from four to six feet. The eggs number five to eight, often seven and are of the usual type. Fifty eggs average 20·3 × 17·6 mm.: maxima **21·7 × 18·0** mm.; minima **19·2** × 17·3 and 20·0 × **15·3** mm. Both birds assist in incubation and sometimes the two occupy the nest-chamber together.

Habits. This is almost entirely a bird of evergreen forests, though it may occasionally be seen flitting, a brilliant flash of blue, down some sunlit stream from one patch of forest to another. It never, however, seems to stay to fish in such stretches but seeks a perch in dense shade, whence it plunges after small fish and water-insects, generally the former. Its note is the same as that of *Alcedo atthis* but is, perhaps, less shrill and is certainly less frequently uttered.

(1541) Alcedo meninting rufigastra.

THE ANDAMAN BLUE-EARED KINGFISHER.

Alcedo rufigastra Walden, Ann. Mag. Nat. Hist. (4) xii, p. 487 (1873) (South Andamans).
Alcedo beavani. Blanf. & Oates, iii, p. 124 (part).

Vernacular names. None recorded.

Description. Bars of the head, crown *and nape* greenish with no purple tinge except, very rarely, on the last; back and rump paler brilliant blue; underparts generally paler.

Measurements. Wing 63 to 69 mm.; bill 34 to 35·5 mm.

Distribution. Andamans only.

Nidification. This Kingfisher breeds in great numbers in the creeks and small streams of the Andamans, making tunnels, some three feet long, well above tide reach. Osmaston, Wickham and Anderson took many nests containing three to five eggs, forty of which average 20·3 × 17·6 mm.: maxima **21·5 × 18·3** mm.; minima **18·8 × 16·9** and 20·9 × **16·8** mm.

They breed principally in June and July.

Habits. Very similar to those of *A. m. coltarti* except that it frequents the jungle right down the coast, both breeding and feeding in fresh, brackish and salt water alike. Osmaston describes it as a very shy little bird.

(1542) Alcedo hercules.

BLYTH'S KINGFISHER.

Alcedo hercules Laubmann, Verhand. der Orn. Gesell. in Bayern, xii, i, p. 238 (1917).
Alcedo grandis. Blanf. & Oates, iii, p. 125.
Alcedo iredalei. Stuart Baker, Bull. B. O. C. xlii, p. 79 (1921).

Vernacular names. *Dao-natu dedao* (Cachari).

Description. From forehead to hind-neck blackish, each feather with a terminal bluish bar centred with a bright pale blue speck; middle of back and rump brilliant pale blue; upper tail-coverts the same but deeper; tail blackish, suffused with blue-green; scapulars and innermost secondaries blackish, overlain with dull green; coverts the same with paler spots centred with brilliant blue shaft-specks; quills blackish edged with dull green-blue, lores blackish with a pale rufous patch next the eye and another under the eye; cheeks and ear-coverts blackish, almost concealed by blue streaks; a white or very pale rufous stripe on either side of the neck; chin and throat pale rufescent or whitish; remaining underparts, axillaries and under wing-coverts deep ferruginous.

Colours of soft parts. Iris blood-red; bill black, the inside of the mouth blood-red; feet coral-red. The female has the base of the lower mandible reddish.

Measurements. Wing 95 to 102 mm.; tail 45 to 47 mm.; tarsus about 11 mm.; culmen 48 to 55 mm.

Distribution. Sikkim to Eastern Assam; Cachar, Sylhet, Manipur and Chin Hills. There is also in the British Museum a single skin from the Five-finger Mts. in Hainan.

Nidification. This fine Kingfisher breeds from April to June, making rather a short tunnel, from one to three feet, on the banks of small streams or deep, almost waterless ravines in dense evergreen forest. The tunnel may be anything from $2\frac{1}{2}$ to 3 inches wide and the chamber anything from 6 to 8 inches either way. The tunnel seems always to be bored upwards except for a few inches at the end, where it dips into the chamber. Nearly always there is a mass of pellets and remains of fish-bones and scales with scraps of insects; these lie both under and on the eggs as well as scattered about in the tunnel and the nest smells very offensively. The eggs number four to six and forty-five average 26·1 × 21·7 mm.: maxima **28·1 × 23·0** mm.; minima **24·8** × 20·6 and 24·9 × **19·8** mm.

The parent birds sit very close and may be generally captured on the nest with a little care.

ALCEDO HERCULES 2/3
Blyths Kingfisher.

Habits. I found this bird not uncommon in North Cachar and still more common in Margherita in Eastern Assam. Here we obtained it at the level of the plains between 750 and 1,000 feet but in the hills of South Assam it frequents altitudes between 2,000 and 4,000 feet. It is a shy, retiring bird keeping to deep forests and even when it is met with on streams too wide for the foliage to meet overhead, it stays always on the shady side of the stream. It perches also low down in the bushes overhanging the stream rather than on conspicuous posts as does the Common Kingfisher and when disturbed darts off with great rapidity, only uttering one cry as it starts. Its note is merely a loud but soft replica of that of the Common Kingfisher and it has the same flight as that bird, swaying from side to side, gleaming cobalt-blue should a sun-ray touch it but looking sombre and black in the shade. It seems to return time after time to the same perch when fishing and I have never seen it ever catch anything but fish, yet there are always insect-remains as well as fish-bones in the nests, so it must eat these also.

(1543) Alcedo euryzona.

THE BROAD-ZONED KINGFISHER.

Alcedo euryzona Temm., Pl. Col., text in livr. 86, next plate 508 (1830) (Java) (misprinted *eryzona*); Blanf. & Oates, iii, p. 126.

Vernacular names. None recorded.

Description.—Male. Forehead to hind-neck sooty-brown barred with faint blue; a ferruginous streak on either side of the neck produced behind the neck to form a broken, indefinite collar; centre of back, rump and upper tail-coverts brilliant pale blue, the last deepest in colour; tail black, slightly washed with dull blue; scapulars and wings blackish-brown tinged with greenish and the coverts with subterminal bluish bars, centred with a still brighter speck; lores black, with a rufous mark above them; ear-coverts and sides and head dull blue-green; chin, throat and fore-neck buffy-white, the feathers of the extreme upper breast white with black edges; a broad dull blue-green band across the breast, the feathers with white centres, sometimes concealed; abdomen rufescent-white; flanks darker and with black streaks; axillaries, under wing-coverts and under tail-coverts creamy-ferruginous.

Colours of soft parts. Iris dark brown; upper mandible black, lower very dark brown, paler at the base in males, vermilion in females; legs and feet vermilion.

Measurements. Wing 83 to 86 mm.; tail 35 to 38 mm.; tarsus about 10 to 11 mm.; culmen 44 to 47 mm.

Female. Upper parts like the male; lower parts rufescent, palest on the chin and throat and deepest on the breast.

Distribution. Java, Borneo, Malay States North to Muleyit in Tenasserim.

Nidification. Mr. W. A. T. Kellow found this Kingfisher breeding in the banks of small streams running through dense forest in the lower hills between 1,000 and 2,000 feet. Two clutches, one of five and one of four eggs, were taken on the 2nd and 5th of February respectively.

Habits. This is said to be a rare and very shy bird restricted to the streams, large and small, running through dense forests in the broken country and lower hills. In the Malay Peninsula and Tenasserim it is not found in the plains but seems to come into them in Borneo and Sumatra. So far as is known its diet is exclusively fish and its note and flight similar to those of *Alcedo atthis*.

Genus CEYX.

Ceyx Lacép., Mém. de l'Inst., 1801, p. 511.

Type, *Ceyx tridactyla* Pall.

In this genus the bill is intermediate between *Alcedo* and *Halcyon*, less compressed than in the former and not grooved; the culmen is straight and slightly flattened; the foot has only three toes, the inner or second being wanting; the tail is very short and rounded; the first primary very long, reaching almost to the tip of the wing.

Ceyx tridactylus.

Key to Subspecies.

A. Crown paler and more lilac ..... *C. t. tridactylus*, p. 260.
B. Crown darker and more ferruginous .... *C. t. macrocercus*, p. 262.

(1544) Ceyx tridactylus tridactylus.

THE INDIAN THREE-TOED KINGFISHER.

Alcedo tridactyla Pall., Spic. Zool., vi, p. 10 (1769) (India, Assam).
Ceyx tridactyla. Blanf. & Oates, iii, p. 127 (part).

Vernacular names. *Dein-nygeen* (Arrakan); *Punchi Malpelihuduwa* (Cing.).

Description. A spot at the base of the forehead black; this varies greatly in size and often runs back up the centre of the forehead; crown, hind-neck, lower back, rump and upper tail-coverts orange-ferruginous glossed with lilac, especially on the sides of the crown and upper tail-coverts; scapulars and upper back deep purple-blue, a few individuals having streaks of brighter blue running down the centre of the back; wing-coverts and quills dull black, the former glossed with deep blue; a spot in front of the eye black and the sides of the forehead

above this generally pale and yellowish; a deep blue patch on either side of the neck; lores, ear-coverts and lower parts orange-yellow, the chin and throat almost white and the flanks and sides of the neck and breast much suffused with rusty; edge of wing, under wing-coverts and axillaries orange-rufous; inner webs of wing-quills rufous, making a large rufous patch on the under surface of the wing.

Colours of soft parts. Iris crimson; brown in young birds; bill and feet bright vermilion.

Measurements. Wing 53 to 61 mm.; tail 21 to 23 mm.; tarsus about 7 to 8 mm.; culmen 29 to 34 mm. The range of variation is practically the same in every country.

Young birds are much duller and have the underparts less yellow and often washed with brownish.

Distribution. Ceylon, Travancore and the Malabar coast to Kanara; the Sahyadri forests near Bombay; Nepal, Sikkim, Bhutan and Assam, including the Terai and adjacent plains; Cachar, Sylhet, Manipur through Burma and the Malay Peninsula to Sumatra and the Philippines and East through Siam and Cochin China to Hainan.

Nidification. This exquisite little Kingfisher breeds in Assam during April and May and again in July and August and apparently during the same months in Ceylon. In most cases it breeds in the banks of tiny streams, rivulets and ravines in evergreen forest, but once I saw a pair excavating their nesting-tunnel in the open sandy bank of a hill-stream some fifty yards across. In less than forty minutes the two birds excavated about 10 inches of tunnel, loosening the sand with the bill and throwing it out behind them just as a dog does when digging. The tunnel may be anything from $1\frac{1}{2}$ to $2\frac{1}{4}$ inches, generally about 2 inches, in diameter and some two feet in length. For the size of the bird the chamber is large, from 5 to 6 inches across either way. The eggs are laid on the bare sand but a few fish-bones sometimes accumulate in the chamber and I have seen scraps of dry moss and other oddments in it, almost certainly merely windblown. The eggs number four to seven, generally five and many are longer and more pointed than is usual with Kingfishers other than the Pied Kingfishers.

The only thirty eggs I have measured average $18{\cdot}9 \times 15{\cdot}6$ mm.: maxima $20{\cdot}0 \times 16{\cdot}4$ mm.; minima $18{\cdot}0 \times 14{\cdot}4$ mm. An abnormally small-sized clutch average only $17{\cdot}8 \times 14{\cdot}0$ mm.

Habits. This little Kingfisher is entirely a forest bird and though it may be seen on fairly broad streams, it will only be on those which run through evergreen or dense secondary forest. Its favourite resorts; however, are tiny rivulets and streams, evergreen with all sorts of tropical ferns and moss etc., whilst often it will be seen where there is no water at all,

hurling itself at a tremendous pace through the trees, twisting and dodging branches and showing sometimes gleaming blue, sometimes vivid pink and then all dull, as sunshine and shade flicker alternately on its plumage. Where it is found on water tiny fish and freshwater shrimps seem to form its sole diet but in the forest it lives much on insects and spiders. Twice I have caught specimens in my huts in the jungle, which they have evidently entered in their search for spiders and once I found one in a huge spider's web, entangled in the sticky mess and sucked dry, presumably by the spiders—a true case of retribution. The note is a very shrill copy of that of *Alcedo atthis* but only seems to be uttered on the wing. It is not shy and I once watched one in a forest-glade for some minutes catching spiders; it flew at the webs with great speed and turning at right angles at the last moment, snatched or missed the spider as it passed. It did not seem to attack any except the quite small ones.

It occurs in the plains near the hills and ascends these for some 4,000 feet, but is most common between 2,000 and 3,000 feet.

(1545) Ceyx tridactylus macrocercus.

THE ANDAMAN THREE-TOED KINGFISHER.

Ceyx tridactylus macrocercus Oberholser, U.S. Nat. Mus., Bull. 98, p. 24 (1917) (Andamans).
Ceyx tridactyla. Blanf. & Oates, iii, p. 127 (part).

Vernacular names. None recorded.

Description. Differs from *C. t. tridactylus* only in having the head a much deeper rufous. Oberholser states that it is a much larger bird and that the black spot on the forehead is wanting or very small. The latter character varies greatly throughout its range and Oberholser's measurements, which agree with those in the British Museum collection, are within the limits of measurements from elsewhere.

Colours of soft parts as in the typical race.

Measurements. Wing 53·5 to 62 mm.; tail 22 to 27 mm.; tarsus about 7 to 8 mm.; culmen 31 to 35 mm.

Distribution. Andamans and Nicobars.

Nidification. Nothing recorded.

Habits. Similar to those of the preceding bird.

Genus RAMPHALCYON.

Ramphalcyon Reichenbach, Handb. Spec. Orn., p. 16 (1851).

Type, *Alcedo capensis* Linn.

This genus contains a group of Kingfishers of the largest size with a very strong, large bill; the culmen is flattened and perfectly straight and there is a well-marked groove on

either side; the wing is rounded, the first being equal to the tenth and the third or fourth quills longest or subequal; the tail is much longer than the bill and slightly rounded.

Key to Species.

A. Wings and tail brown ..... *R. amauroptera*, p. 263.
B. Wings and tail blue or green ..... *R. capensis*, p. 264.

(1546) Ramphalcyon amauroptera.

The Brown-winged Kingfisher.

Halcyon amauropterus Pearson, J. A. S. B., x, p. 635 (1841) (Calcutta).
Pelargopsis amauroptera. Blanf. & Oates, iii, p. 128.

Vernacular names. *Gurial* (Beng.).

Description. Whole head, neck, underparts, axillaries, under wing-coverts and edges of inner webs of wing-quills deep ochraceous-buff, the hind-neck often paler and brighter; centre of lower back, rump and upper tail-coverts brilliant pale blue; extreme upper back, exposed wings and tail dark chocolate-brown.

Colours of soft parts. Iris brown; eyelids brick-red; bill crimson or scarlet-crimson, dark blackish-brown at the tip; legs and feet scarlet.

Measurements. Wing 141 to 160 mm.; tail 86 to 98 mm.; tarsus 18 to 19 mm.; culmen 70 to 82 mm.

Young birds have the feathers of the sides and back of neck, the breast and flanks finely edged with dusky brown, making all these parts to appear finely barred.

Distribution. Eastern Bengal and South Assam, Arrakan, Pegu, Tenasserim and South-West Siam.

Nidification. The only authentic eggs known to me of this Kingfisher are a set of four taken by myself in a tiny muddy creek off the Barak River in Sylhet on the 11th April. The tunnel was excavated nearly at the top of the bank and, at that time, nearly 16 feet above the water. It measured about a foot in depth and about 4 inches in diameter, the chamber being nearly 8 inches in every direction. The four eggs lay on the bare earth and measured about 35·0 × 30·1 mm. A second clutch taken by myself contained two young and two addled eggs; the bird was seen for a second as she left the nest-hole, which was exactly similar to the one already described except that it was 2 feet deep. The young birds appeared to be of this species.

Habits. The Brown-winged Kingfisher is a bird of coastal rivers and directly these rivers become clear and quick-running the birds do not ascend them. Thus I saw them on the Megna and its various creeks and branches as far North as Mymensingh and it wandered up the muddy waters of the Barak into Cachar.

On the Brahmaputra, however, I have never seen it, its rapid current and clearer water not suiting them. In Burma it seems to be even more exclusively a coastal, salt-water bird. It is extremely noisy, having the very harsh, penetrating voice common to all the genus. Its flight is generally rather leisurely but it is capable of considerable speed when necessary. Its food on tidal rivers consists in great part of the tiny crabs which swarm in the muddy banks at low tide.

Ramphalcyon capensis.

Alcedo capensis Linn., Syst. Nat., 12th ed., i, p. 180 (1766).

Type-locality: Java. Oberholser, Proc. U.S. N. M., xxxv, p. 663 (1909).

The typical form is very close to *intermedia* but has the upper parts more green, less blue.

Key to Subspecies.

A. Crown ochraceous, not contrasting with nuchal collar ..... *R. c. intermedia*, p. 264.
B. Crown some shade of grey or brown, contrasting with more yellowish nuchal collar.
  a. Head much darker brown..... *R. c. gurial*, p. 265.
  b. Head much paler brown ..... *R. c. burmanica*, p. 266.

(1547) Ramphalcyon capensis intermedia.

The Nicobar Stork-billed Kingfisher.

Pelargopsis intermedia Hume, Str. Feath., iii, p. 166 (1874) (Galatea Bay, Nicobars).
Pelargopsis leucocephala. Blanf. & Oates, iii, p. 129.

Vernacular names. None recorded.

Description. Whole head, nape, neck, lower plumage, axillaries and under wing-coverts rich ochraceous, the chin and throat a little paler; the crown decidedly paler, with the black bases showing through, especially when the feathers become abraded; centre of lower back, rump and upper tail-coverts brilliant pale blue; upper back, scapulars, exposed wings, except the outer primaries, deep steel blue, only slightly tinged with green on the back; outer primaries blackish; all quills edged paler on the inner webs.

Colours of soft parts. Iris hazel-brown; eyelids vermilion-red; bill deep coral-red, tipped darker; legs and feet vermilion.

Measurements. Wing 150 to 152 mm.; tail 94 to 98 mm.; tarsus about 15 mm.; culmen 74 to 80 mm.

Distribution. Nicobars only.

Nidification. Nothing on record but Davison gave a single egg of this Kingfisher to Mr. G. Vidal which is now in my collection.

It measures 38·0 × 30·4 mm. and was taken in Car Nicobar on the 21st April.

Habits. A shy, wary bird found only on the coast and when first seen generally sitting on a forked stake actually in the sea or upon a dead mangrove branch overhanging it. The cry is the usual unpleasant one of the genus.

(1548) Ramphalcyon capensis gurial.

THE BROWN-HEADED STORK-BILLED KINGFISHER.

Alcedo gurial Pearson, J. A. S. B., x, p. 633 (1841) (Midnapore, Bengal).
Pelargopsis gurial. Blanf. & Oates, iii, p. 129 (part).

Vernacular names. *Gurial* (Beng.); *Badami Kourilla* (Hind., Oude); *Maha Pili-huduwa*, *Wateranuwa* (Cing.).

Fig. 41.—Head of *R. c. gurial.* ⅔.

Description. Upper part of head, neck, lores and sides of head dark brown, contrasting strongly with the ochre collar; remainder of plumage similar to *intermedia* but the wings, back and tail much more green and less blue; the chin and throat are whitish and the ochre elsewhere generally paler and less rich in tint.

Colours of soft parts. Iris deep brown; bill dark blood-red, changing to black at the tip, darker at the base and brightest on the gonys; legs and feet coral-red, claws dusky.

Measurements. Wing 143 to 166 mm.; tail 86 to 96 mm.; tarsus about 16 mm.; culmen 73 to 85 mm.

Young birds are barred as in *R. amauroptera*, the bars broader on the breast than elsewhere, forming a broad pectoral band.

Distribution. Practically throughout the wetter portions of Ceylon and India. East it extends to Assam and extreme Eastern Bengal in Tippera and Chittagong but not to the Chin Hills.

Nidification. Stewart and Bourdillon found this bird breeding in Travancore from January to April and again from the end of May to July. In Assam it breeds during March and April, whilst Whymper took eggs in April and May in Kuman. In Ceylon they are said to lay from January to April. All the nest-holes

I have seen myself have been dug in banks of streams, generally in such as are well covered with jungle or forest and are slow-running or even stagnant. In the jungle-covered lowlands at the foot of the Assam Hills it was not uncommon but, though not shy, it kept much to thick cover, so it was difficult to find nests. The tunnels are generally about two or three feet long, with a diameter varying from 3 to 4 inches. The eggs are laid on the bare soil and I have never seen any debris of fish or insects in chamber or tunnel. The full clutch is four, rarely five, occasionally only three. Thirty eggs average 36·6 × 31·2 mm.: maxima **38·4** × 32·0 and 37·5 × **32·5** mm.; minima **34·2** × 30·5 and 35·5 × **29·3** mm. The eggs taken by Cripps in Dibrugarh were probably those of *Halcyon smyrnensis*.

Habits. This Stork-billed Kingfisher is not the shy bird it is generally represented to be and does not resent being watched but it keeps so entirely to well-wooded or deep shady ravines, streams and ditches that is escapes observation. In the same way when fishing it sits in a bush or some thick bit of cover and not on an exposed position like so many other Kingfishers. It takes its prey, when fish, just like the common *Alcedo*, plunging into the water and sometimes going right under. It lives much on fish but is very wide in its tastes. Frogs, small lizards, grass-snakes, crabs, prawns, locusts and grasshoppers are all greedily eaten and it probably often takes young birds from nests, for I have personally seen it take a young Myna from its nest and devour it. Its flight is very powerful and rapid but it has a habit of flying quite slowly along in deep shade, uttering its loud raucous cry as it goes.

(1549) Ramphalcyon capensis burmanica.

THE BURMESE STORK-BILLED KINGFISHER.

Pelargopsis burmanica Sharpe, P. Z. S., 1870, p. 67 (Taunghoo, Burma).
Pelargopsis gurial. Blanf. & Oates, iii, p. 129 (part).

Vernacular names. *Hsin-pay-nyin* (Burmese).

Description. Similar to *R. c. gurial* but with a much paler head and with the lower parts a richer, deeper ochre.

Colours of soft parts as in *R. c. gurial*.

Measurements. Wing 146 to 165 mm.; culmen 72 to 84 mm.

Distribution. All Burma to the extreme south, Siam, Andamans.

Specimens from the Andamans are very pale and worn and rather small, wing 141 to 152 mm., with large bills measuring 78 to 85 mm., but more material is required before it can be decided as to whether they should be separated.

Nidification. This Kingfisher breeds in the greater part of Burma in March, April and May but deposits its eggs in most peculiar places. Occasionally they excavate burrows in river-

banks just as the preceding bird does but this is by no means the usual custom. Hopwood found its eggs deposited in a burrow made in a "White Ants'" nest-mound. Herbert took eggs on two occasions from holes made in dead or partly dead trees and once in a living tree; nor could there have been any mistake, as in all three instances the bird was caught on the nest. More curious than any, however, was Bingham's find of its eggs laid in a made nest, probably of some other bird, in a bamboo clump in Tenasserim. The eggs are like those of the genus generally. Twenty average 36·3 × 31·1 mm.: maxima **38·3** × 30·2 and 37·0 × **32·1** mm.; minima **34·3** × **30·0** mm. An abnormally small egg measures 32·1 × 26·3 mm. It has been recorded by Herbert that on one occasion he found that a pair of birds using a hole in a tree for their eggs had lined it neatly with about a dozen green leaves.

Habits. Those of the genus.

Genus **HALCYON**.

Halcyon Swains., Zool. Illus., text to plate 27 (1820).

Type, *Halcyon senegalensis* Linn. West Africa.

In this genus the bill is rather large and is broad at the base, the culmen straight, rounded above and without any groove on the sides; the wing is rounded, the third or fourth quill longest and the first equal to, or shorter than, the seventh; in many specimens the second, third and fourth are almost equal and the wing formula generally seems very unstable in this genus and even in each species; the tail is longer than the culmen and well graduated; a characteristic feature is a white wing-patch on the bases of the primaries.

The bill in this genus is red throughout in both sexes.

I restrict the genus, in so far as India is concerned, to *Halcyon smyrnensis* and *H. pileata*, agreeing with Blanford that character in colour and pattern suffice to distinguish it from *Entomothera* and differences in bill and colour from *Sauropatis*.

Key to Species.

A. Head and neck chestnut ..... *H. smyrnensis*, p. 267.
B. Crown black with a white collar ..... *H. pileata*, p. 271.

Halcyon smyrnensis.

Key to Subspecies.

A. Paler both above and below.
  a. Upper plumage more green, less blue; forehead paler than crown..... *H. s. smyrnensis*, p. 268.
  b. Upper plumage more blue, less green; forehead and crown concolorous ..... *H. s. fusca*, p. 269.
B. Darker both above and below.
  c. Smaller, wing under 120 mm. ..... *H. s. generosa*, p. 270.
  d. Larger, wing over 120 mm. ..... *H. s. saturatior*, p. 270.

(1550) Halcyon smyrnensis smyrnensis.

THE WHITE-BREASTED KINGFISHER.

Alcedo smyrnensis Linn., Syst. Nat., 10th ed., i, p. 116 (Africa and Asia).

Halcyon smyrnensis. Blanf. & Oates, iii, p. 132 (part).

Vernacular names. *Dalel* (Sind); *Kilkila* (Hind.); *Nulla machrala* (Chamba).

Description. Chin, throat and centre of breast white; remainder of head, neck and lower plumage chocolate-brown, generally a little paler on the forehead; interscapulars, scapulars, innermost secondaries and tail greenish-blue; lower back, rump and under tail-coverts brilliant light blue, the longest coverts generally greenish; lesser wing-coverts chocolate-brown, median coverts black; greater and primary coverts dull greenish-blue; primaries black, with an increasingly broad band of blue on the outer and of white on the inner webs; secondaries greenish-blue, edged with dusky on the inner webs; edge of shoulder of wing white; axillaries and under wing-coverts chocolate.

Colours of soft parts. Iris hazel to dark brown; bill coral-red to deep red, purplish-brown on the tip and edges of the upper mandible; legs and feet coral-red.

Measurements. Wing 118 to 128 mm.; tail 78 to 93 mm.; tarsus 14 to 15 mm.; culmen 55 to 63 mm.

Distribution. Asia Minor, Syria, Arabia, Mesopotamia, Persia, Afghanistan, Baluchistan, Sind, Punjab and Kashmir. In Europe it has straggled as far West as Cyprus and Denmark.

Nidification. The White-breasted Kingfisher breeds within our limits during February, March and April, the time being controlled by the normal flooding of the rivers, in the banks of which they breed. The burrows cannot be excavated until after the rainy season and the young have to be hatched and reared before the melting of the snow causes the first flood. The burrows are practically always made in banks of rivers in open country, but the birds wander up the hills to some height. The tunnels vary in length, according to the nature of the soil, from two to six feet, ending in a chamber about 8 by 6 inches. Six is the normal clutch of eggs laid, often five only and rarely seven. They are of the usual spherical shape and shiny white surface and often, when held up to the light after being just blown, show marks like ribbon watermarks, a character not seen in Bee-eaters' eggs, which are otherwise indistinguishable from those of Kingfishers.

Thirty eggs average 29·4 × 26·2 mm.: maxima **31·7** × 25·9 and 29·7 × **28·0** mm.; minima **28·2** × **24·6** mm.

Habits. Similar to those of the better-known and more widely-spread Indian form but not so strictly frequenting water surrounded with forest.

(1551) Halcyon smyrnensis fusca.

THE INDIAN WHITE-BREASTED KINGFISHER.

Alcedo fusca Bodd., Tab. Pl. Enl., p. 54 (1783) (Malabar).
Halcyon smyrnensis. Blanf. & Oates, iii, p. 132 (part).

Vernacular names. *Kilkila* (Hind.); *Khandu, Khandya* (Mahr.); *Sanda-buk machranga* (Beng.); *Lakmuka, Buche gadu* (Tel.); *Vichuli* (Tam.); *Dane-nyin* (Burm.); *Dao natu-gophu* (Cachari); *Lali mach-sorai* (Assam).

Description. Differs from the typical form in being more blue, less green on the upper parts; the centre of the back is generally a deeper blue and the chocolate-brown is also often of a deeper shade, whilst there is no visible difference between the crown and forehead.

Colours of soft parts. As in the other races.

Measurements. Wing 115 to 126 mm.; culmen 48 to 60 mm.

Young birds are like the adults but have the black coverts tinged with green and the white feathers of the fore-neck and breast narrowly edged with blackish. The bill is dull brown tinged with red, more especially on the lower mandible.

Distribution. Practically all India except the extreme South of Travancore and the range occupied by the preceding form; all Burma, Malay Peninsula, Siam and Cochin China.

Nidification. This Kingfisher breeds throughout its range wherever there are rivers and streams of sufficient size. Normally it excavates a tunnel on the bank just as other Kingfishers do. It prefers light sandy soil and in these the tunnel often exceeds six, or even seven, feet in length; in harder soil it contents itself with one of half, or less, this length. Hume took one clutch of eggs from a well at 100 feet below ground level and another from the mud bastion of an old fort.

In the North Cachar Hills a few individuals breed in an absolutely abnormal manner. The vast majority of birds even here excavate their burrows in the banks of the bigger streams in the way adopted by all respectable Kingfishers, but a few birds select banks in tiny streamlets running through dense evergreen forests. In these they dig no tunnel but make use of a natural hollow, plugging it up with muddy green moss until the entrance is small enough to meet their taste. The nests, in fact, look like a gigantic Wren's nest, though when examined there are no back and sides, only a rather bulging front. The actual building of such a nest by a pair of these Kingfishers is an act I have been fortunate enough to watch, or I could never have credited their making them.

They breed in March and April on rivers and water liable to floods, but any time from April to June on other waters. They lay from four to eight eggs but in nine cases out of ten the full clutch is six. One hundred eggs average 28·9 × 26·2 mm.: maxima

31·1 × 27·7 and 30·3 × 28·0 mm.; minima 26·0 × 25·6 and 26·2 × 25·0 mm. Typically they are very spherical, a characteristic of all Kingfishers of this genus.

The nest-tunnels very seldom contain pellets or remains of food.

Habits. This *Halcyon* keeps to forest and cover and actually hunts for its food as much on land as over water. Its principal articles of diet are undoubtedly grasshoppers and locusts, but it will eat almost any living thing not too large to swallow. Frogs, small lizards, worms, etc., are all thankfully taken and eaten; I have seen it taking cicadæ from the trunks of trees, whilst prawns, small crabs, etc., are taken in preference to fishes when it hunts streams. It is a very noisy bird and its harsh cackling cries may be heard at a great distance, uttered as they generally are from a bare branch high up in some tall tree.

(1552) Halcyon smyrnensis generosa.

The Ceylon White-breasted Kingfisher.

Halcyon generosa Madarasz, Ann. Mus. Hung., ii, p. 85 (1904) (Ceylon).
Halcyon smyrnensis. Blanf. & Oates, iii, p. 132 (part).

Vernacular names. *Pili-huduwa* (Cing.); *Pinkotti* (Tam.).

Description. This is merely a rather smaller, rather darker form than *H. s. fusca.*

Colours of soft parts as in the Indian race.

Measurements. Wing 108 to 117 mm.; culmen 49 to 55 mm.

Distribution. Ceylon and the extreme South of Travancore.

Nidification. Wait and Phillips have taken fresh eggs of this Kingfisher in every month of the year from February to August, the tunnels being excavated in the banks of rivers, tanks and ditches, both in the open and in forest. The number of eggs in the clutch vary from three to five, the latter number apparently exceptional. Fifty eggs average 29·4 × 25·9 mm.: maxima 32·0 × 28·0 mm.; minima 26·2 × 24·9 and 27·3 × 24·2 mm.

Habits. The same as those of the preceding bird. Wait says it is often to be seen in compounds and gardens.

(1553) Halcyon smyrnensis saturatior.

The Andaman White-breasted Kingfisher.

Halcyon saturatior Hume, Str. Feath., ii, pp. 168, 531 (1874) (Andamans).
Halcyon smyrnensis. Blanf. & Oates, iii, p. 132 (part).

Vernacular names. None recorded.

Description. This is the darkest coloured and largest of all the Indian forms; some individuals can be matched in colour with

the darkest specimens from Ceylon but these latter are very much smaller.

Colours of soft parts as in the other races.

Measurements. Wing 123 to 134 mm.; culmen 54 to 63 mm.

Distribution. Andamans and Nicobar Islands.

Nidification. Osmaston found this Kingfisher extremely common in the Andamans and took many nests. The full clutch of eggs seems to be three and only on two occasions did he find four. The birds breed almost entirely in April and May, excavating a very short tunnel, from one to three feet in length, in the banks of rivers, ditches and creeks running into the sea. Sixty eggs average 30·2 × 26·4 mm.: maxima **32·0** × 26·2 and 30·3 × **28·0** mm.; minima **28·9** × 26·4 and 29·0 × **24·3** mm.

Habits. Similar to those of the other races, though this form seems to keep much to coastal creeks and the streams near the coast.

(1554) Halcyon pileata.

THE BLACK-CAPPED KINGFISHER.

Alcedo pileata Bodd., Tabl. Pl. Enl., p. 41 (1783) (China, Canton).
Halcyon pileata. Blanf. & Oates, iii, p. 133.

Vernacular names. None recorded.

Fig. 42.—Head of *H. pileata.* ⅔.

Description. A small patch of feathers below the eye white; sides of the head, forehead, crown and nape velvety black; a broad white collar on the hind-neck, more or less suffused with buff; scapulars, back, upper surface of tail, greater primary coverts, outer webs of outer secondaries and whole inner secondaries deep blue; lower back, rump and upper tail-coverts brighter dark blue; remainder of wing-coverts black, primaries black edged with blue on the bases of the outer webs and with a broad white patch on the inner web showing as a broad white band on the under surface of wing; chin, throat and fore-neck white, meeting the white collar; breast buffy-white changing to rufous-buff on the abdomen, flanks, under tail and wing-coverts and axillaries.

Colours of soft parts. Iris dark brown; bill deep coral-red; legs and feet dark red.

Measurements. Wing 127 to 133 mm.; tail 83 to 88 mm.; tarsus about 15 mm.; culmen 57 to 65 mm.

Young birds have numerous black striæ running from the lower mandible to the neck and the feathers across the breast edged with black.

Distribution. This is a bird with an extraordinarily wide range from Ceylon, Travancore, throughout India in various localities, through Burma and the Indo-Chinese countries to China and Corea; through the Malay States to the Celebes. In India it occurs in various places on the coasts and tidal rivers, following these up practically to the hills.

Nidification. Staff-Surgeon Jones found this fine Kingfisher breeding in considerable numbers round about Hongkong. Here they were breeding in banks of rivers and creeks, their tunnels, chambers and eggs being quite similar to those of *H. smyrnensis* and made in comparatively open country. All his eggs were taken in May and June. Hopwood took five eggs in April from a hole dug in a bank near a mangrove swamp in South Tenasserim and I personally took one clutch in a hole made in a termite mound in the centre of dense forest in Dibrugarh in May. Herbert took a single egg of this bird from a hole in a branch of a tree, about six feet from the ground, in the middle of July. Forty-two eggs average 29·6 × 26·3 mm.: maxima **31·2** × 28·0 and 31·0 × **28·3** mm.; minima **28·0** × 25·3 and 28·6 × **24·9** mm. Like other *Halcyon* eggs they are very spherical.

Habits. This Kingfisher is a bird of forested sea-coasts over most of its area but in South China, where it is comparatively common, it habitually frequents open country. In Assam it follows the great tidal rivers right up to Assam but the few recorded from that Province were all on slack waters in heavy forest. It is apparently far more a fish-eater than the White-breasted Kingfisher but varies this diet not only with small crabs and prawns but also with grasshoppers and insects of various kinds. It flight is swift and direct and its voice shrill and loud but not so unpleasant as that of *Halcyon smyrnensis*.

Genus **ENTOMOTHERA**.

Entomothera Horsf., Trans. Linn. Soc., xiii, p. 173, note (1820).

Type, *Entomothera coromandus* Lath.

The genus *Entomothera* structurally resembles *Halcyon* but is distinguished from the species of that genus by its totally different coloration, which is violet-chestnut except on the lower back and rump.

Entomothera coromanda.

Key to Subspecies.

A. Smaller; much paler below ..... *E. c. coromanda*, p. 273.
B. Larger; much darker below ..... *E. c. mizorhina*, p. 274.

(1555) Entomothera coromanda coromanda.

THE INDIAN RUDDY KINGFISHER.

Alcedo coromanda Lath., Ind. Orn., i, p. 252 (1790) (Coromandel coast *in errore*; Rangoon, *Oberholser*).
Callialcyon lilacina. Blanf. & Oates, iii, p. 134 (part).

Vernacular names. *Dao-natu gajao* (Cachari).

Description. Middle of lower back and rump white tinged with blue, more definitely blue on the tips of the feathers; whole remaining upper parts with light rufous-chestnut, overlain, more especially on the back, with a violet sheen; underparts pale orange-rufous, palest and more yellow on the chin, throat and centre of the abdomen.

Colours of soft parts. Iris dark brown; bill red, darker at the base, pinker and paler at the tip; legs and feet pinkish-red to pale coral-red.

Measurements. Wing 106 to 121 mm.; tail 60 to 66 mm.; tarsus about 15 to 16 mm.; culmen 46 to 57 mm.

Young birds are a darker, browner chestnut with no gloss and the feathers of the lower parts from throat to abdomen are edged with black, albescent on the chin but darker rufous elsewhere than in the adult; the rump and upper tail-coverts are a deeper blue. The bill is almost wholly black with an orange-red tip and the feet are a dull dirty reddish.

Distribution. Himalayas from Nepal to E. Assam, Burma and the Malay States but not Singapore; South-West Siam.

Nidification. This most beautiful Kingfisher breeds only in the interior of evergreen forest, making its nest-tunnel in the bank of some deep and gloomy ravine, along the bottom of which a tiny rivulet finds its way, swelled to a more robust flood after heavy rain. The tunnel is usually a short one, between one and three feet in length and barely two inches in diameter, whilst the chamber may be some six inches across. The entrance may be in the moss-covered face of the bank, under a boulder or screened by ferns, bushes or other plants, never, as far as I know, in a bare upright bank. The eggs number four to six and thirty average 27·3 × 23·2 mm.: maxima 29·4 × 23·6 and 28·9 × 24·2 mm.; minima 26·2 × 23·0 and 27·0 × 21·5 mm.

Habits. In the Himalayas this Kingfisher is found up to 5,000 and less often up to 6,000 feet but it is such a shy bird, keeping so exclusively to dense jungle that it is seldom seen. A flash of

brilliant opal as it dashes through some gleam of sunshine, a shrill, high-pitched note not unlike that of the Common Kingfisher and it is seen and heard no more. Its flight is wonderfully quick and it works through the tangled growth at an incredible speed. The few stomachs I have examined contained small insects and tiny land shells, once a lizard about three inches long and once a mass of tadpoles. In Burma and the Malay Peninsula it is said to be frequently found in mangrove swamps on the coast.

(1556) Entomothera coromanda mizorhina.

THE ANDAMAN RUDDY KINGFISHER.

Entomothera coromanda mizorhina Oberholser, Proc. Nat. Mus. U.S., 1915, p. 645 (N. Andaman Is.).
Callialcyon lilacina. Blanf. & Oates, iii, p. 134 (part).

Vernacular names. None recorded.

Description. Similar to the preceding bird but above a much darker rufous, entirely overlain by a brilliant purple-violet sheen; below also much darker and with a certain amount of violet sheen on the breast and fore-neck.

Colours of soft parts as in the typical form.

Measurements. Wing 112 to 122 mm.; tail 78 to 81 mm.; tarsus about 16 to 17 mm.; culmen 57 to 60 mm.

Distribution. Andamans and probably Nicobars.

Nidification. Unknown.

Habits. A bird of the mangrove swamps and dense forest of which practically nothing is known.

Genus SAUROPATIS.

Sauropatis Cab. & Heine, Mus. Hein., Th. ii, p. 158 (1860).

Type, *Halcyon sanctus* Vigors & Horsf.

The genus *Sauropatis* is easily distinguishable from *Halcyon* by its short, broad bill, of which the lower mandible is much more curved upwards; the bill also is black or nearly all black and not red.

The sexes are alike. It is represented in our limits by a single species divisible into many races, which are again individually very variable.

Key to Subspecies.

A. Underparts pure white.
a. Smaller; wing under 108 mm. ..... *S. c. chloris*, p. 275.
b. Larger; wing over 109 mm. ..... *S. c. vidali*, p. 276.
B. Underparts sullied with buff.
c. A very broad buffy white supercilium to the nape ..... *S. c. occipitalis*, p. 277.
d. Supercilium absent or obsolete ..... *S. c. davisoni*, p. 278.

It is very doubtful whether all these forms should not be treated as subspecies of *Sauropatis vagans* Lesson of New Guinea, which differs in its buff-coloured underparts and collar as well as in other minor details.

(1557) Sauropatis chloris chloris.

THE WHITE-COLLARED KINGFISHER.

Alcedo chloris Bodd., Tabl. Pl. Enl., p. 49 (1783) (Buru, Moluccas).
Sauropatis chloris. Blanf. & Oates, iii, p. 135 (part).

Vernacular names. *Nok-poh-piu* (Siam).

Fig. 43.—Head of *S. chloris chloris.* ⅔.

Description. Lores and a few feathers above the forehead black; a white or fulvous patch above the lores sometimes produced back to the eye; crown, nape and upper sides of head bluish-green; ear-coverts dark bluish-green, more or less mixed with black and sometimes produced as a black band behind the nape (*chloris chloris*) and sometimes absent (*chloris armstrongi*); in some specimens the ear-coverts are all blue (*chloris humii*); lower parts, sides of neck and a broad collar on the extreme upper back white; upper back and scapulars greenish-blue or bluish-green; lower back, rump and upper tail-coverts bright blue; tail dark blue, sometimes tinged with greenish; wing-coverts blue, tinged with greenish on the shoulder; quills black, edged on all but the first with blue, deepest at the base, paler at the tips; the innermost secondaries nearly all of this colour.

Colours of soft parts. Iris deep brown; upper mandible and terminal third of lower black or deep greenish-black; basal two-thirds of lower mandible pinkish or yellowish-white; legs slaty-black or plumbeous.

Measurements. Wing 96 to 107 mm.; tail 62 to 65 mm.; tarsus about 15 mm.; culmen 40 to 47 mm.

Young birds have the feathers of the breast edged with dusky and sometimes show a tinge of fulvous on the collar and lower parts.

Distribution. The coasts of the North-Eastern Districts of

Bengal; once Cachar in Assam; Burmese coastal districts, Siam, Malay States, Borneo, Java, Sumatra, Annam.

Nidification. The White-collared Kingfisher breeds in some numbers in and about Bangkok. Herbert * says that the eggs are almost invariably laid in chambers with very short entrance-tunnels made in the nests of ants which breed in hollow trees. These ants make great black, papier-maché looking nests, blocking up the entrance to hollow trees, sometimes more than a foot in diameter. Occasionally the Kingfishers will cut out a nest-hole for themselves in a soft, rotten tree and once he saw the young birds in a hollow made in a termites' mound. In each case, whether termites' or ants', the nests were live ones full of termites or ants. The ants' nests selected in trees were usually somewhere about twenty feet from the ground but one of those bored by the birds in a dead tree was within a foot of it. The eggs seem to be practically always four, though twice Herbert found only three young. Typically they are broad ovals but rather less so than those of *Halcyon*, whilst a few are long ovals, rarely even somewhat pointed at the smaller end. Thirty-two eggs average 28·9 × 24·2 mm.: maxima **32·0** × 25·2 and 31·0 × **26·2** mm.; minima **27·8** × 23·0 and 28·0 × **22·5** mm.

Herbert took eggs from February onwards and found newly-fledged young as late as August. Kellow took eggs from similar situations in Perak in the month of January. In Siam fruit gardens seem to furnish the favourite nesting-sites.

Habits. When not breeding this Kingfisher is most common along the coast but when breeding makes for more inland resorts and Herbert says that, though found all the year round in Bangkok, their numbers are greatly augmented during the breeding-season when this bird becomes very common, their harsh cry of "krerk-krerk-krerk-krerk" being heard on all sides. At the commencement of the Rains many birds leave. They are very tame, confiding birds, haunting the vicinity of villages and towns and even breeding close to houses. Their food consists largely of small land-crabs but they also feed on grasshoppers, insects, small reptiles, etc.

(1558) Sauropatis chloris vidali.

THE MALABAR WHITE-COLLARED KINGFISHER.

Halcyon vidali Sharpe, Cat. B. M., xvii, p. 278 (1892) (S. Konkan).
Sauropatis chloris. Blanf. & Oates, iii, p. 135 (part).

Vernacular names. None recorded.

Description. Very similar to *S. c. chloris* but on the whole brighter and paler blue on the wings and more consistently green

* Journal Siam. Nat. Hist. Society, vol. vi, 3, pp. 310-311 (1924).

on the back; the ear-coverts are green with no trace of black and the black nuchal collar is absent whilst the white collar is very wide.

Colours of soft parts as in the other races.

Measurements. Wing 110 to 116 mm.; tail 70 to 73 mm.; tarsus about 16 mm.; culmen 42 to 49 mm.

Distribution. South-West coast of India. Stewart and Bourdillon both record it from Travancore and it appears to inhabit the coastal region from Travancore to the Konkan.

Nidification. Nothing recorded.

Habits. This seems to inhabit not only the well-wooded shores of the Western coast but to be found some distance inland on forested streams and creeks. Its habits seem to be very similar to those of the preceding bird.

(1559) Sauropatis chloris occipitalis.

The Nicobar White-collared Kingfisher.

Todiramphus occipitalis Blyth, J. A. S. B., xv, p. 23 (1847) (Nicobars).
Sauropatis occipitalis. Blanf. & Oates, iii, p. 137.

Vernacular names. None recorded.

Description. Differs from all other races in being much more fulvous on the abdomen and vent; the fulvous patch above the eye is produced back as a broad supercilium to the nape and meets behind the crest above the black collar; the general tone of plumage is very dark and the crown very green.

Colours of soft parts as in the other races.

Measurements. Wing 105 to 113 mm.; tail 65 to 72 mm.; tarsus 14 to 15 mm.; culmen 40 to 48 mm.

Distribution. Nicobars.

This race seems to form a connecting link with the more Eastern and Australian forms.

Nidification. Davison records taking many of its nests; all made in clay nests of ants placed against the trunks of large trees or more rarely against coconut-palms. The entrance-tunnel is short, a few inches only and the chamber about seven inches across. Osmaston took a pair of these eggs in April but Davison found the birds breeding in February and March. The few eggs I have seen vary between $30{\cdot}0 \times 24{\cdot}3$ and $26{\cdot}4 \times 22{\cdot}5$ mm.

Habits. Those of the genus.

(1560) Sauropatis chloris davisoni.

THE ANDAMAN WHITE-COLLARED KINGFISHER.

Halcyon davisoni Sharpe, Cat. B. M., xvii, p. 282 (1892) (Andamans).
Sauropatis chloris. Blanf. & Oates, iii, p. 135 (part).

Vernacular names. None recorded.

Description. Differs principally from *S. c. chloris* in having the sides of the chin, throat and flanks, together with the vent and under tail-coverts, more or less sullied with buff; the ear-coverts are dark and mixed with black whilst the black nuchal collar, though narrow, is practically always present; the white collar below is also bordered with dark brownish-green; the faint sub-barring of the tail-feathers, which hardly shows in the typical form and in *vidali*, is very apparent in this.

Colours of soft parts as in the other races.

Measurements. Wing 96 to 105 mm.; tail 63 to 67 mm.; tarsus about 14 to 15 mm.; culmen 38 to 41 mm.

Distribution. Andamans and Little Cocos Islands.

Nidification. Osmaston took several nests of this bird in the Andamans, nearly all of which are described as short tunnels, some one to three feet long, cut in the banks of coastal streams or brackish streams. Anderson and Wickham, however, seem to have taken eggs from ants' nests high up in trees, just as Herbert found them in Siam. The full clutch of eggs is either three or four, generally the latter, and thirty eggs average 29·3 × 24·8 mm.: maxima **31·0 × 26·5** mm.; minima **27·6** × 23·3 and 29·0 × **23·0** mm. The principal breeding months are April and May but eggs have been taken from early March to late June.

Habits. Those of the genus, not differing from the habits of *S. c. chloris* except that this form is more exclusively a coastal forest bird.

Genus CARIDAGRUS.

Caridagrus Cab. & Heine, Mus. Hein., Th. ii, p. 161 (1860).

Type, *Dacelo concreta* Temm.

This genus differs from *Sauropatis* in its still broader and shorter bill. The sexes differ in plumage and one or both are spotted. The genus is represented from Tenasserim through the Malay Peninsula and in the Philippines.

(1561) Caridagrus concretus.

THE SUMATRAN KINGFISHER.

Dacelo concreta Temm., Pl. Col., pl. 346 (1825) (Sumatra).
Caridagrus concretus. Blanf. & Oates, iii, p. 138.

Vernacular names. None recorded.

Description. Forehead and a narrow supercilium pale ferruginous; crown and nape green, passing to brilliant verdigris-green-blue at the sides and back; lores and a line through the eye black, passing back and round the green crown; a rufous line from the base of the bill, interrupted on the sides of the neck by a black line and joining a broad, deeper rufous collar on the hind-neck; extreme upper back black; lower back, rump and upper tail-coverts ultramarine-blue; remainder of upper plumage, exposed wings and tail deep purple-blue; edge of wing and two outer primaries rufous; quills black on concealed portion of outer and on inner webs; a very broad deep blue moustachial streak; lower surface bright ferruginous, paler on the chin and throat and albescent on the centre of the abdomen; a patch of black on the sides of the breast under the wing.

Colours of soft parts. Iris dark brown; upper part of upper mandible blackish, remainder of bill horny-chrome; feet yellow-chrome.

Measurements. Wing 110 to 123 mm.; tail 55 to 61 mm.; tarsus about 18 to 19 mm.; culmen 41 to 50 mm.

Female has the deep blue of the wings and outer scapulars replaced by dull green with pale buff spots, large on the wing-coverts, small on the scapulars and innermost secondaries.

Young males are like the adult male but have the wing-coverts spotted with greenish-buff.

Distribution. From the extreme south of Tenasserim to Singapore, Java, Sumatra and Borneo.

Nidification. Unknown.

Habits. Davison obtained this beautiful Kingfisher in the heart of dense forest. He remarks: "This is not a water Kingfisher at all, but feeds on the ground, almost exclusively on lizards and the large wood-lice so common in these damp woods. It is shy and difficult of approach, and when disturbed it flies off with a sort of low chuckle."

Genus CARCINEUTES.

Carcineutes Cab. & Heine, Mus. Hein., Th. ii, p. 163 (1860).

Type, *Dacelo pulchella* Horsf.

Sexes different in colour, the males barred with blue and black above, the females with rufous and black; feathers of the nape slightly elongated; bill broad and short with the culmen straight

and the ridge rounded; first primary shortest of all, tail moderately long and rounded at the end.

Carcineutes pulchellus.

Dacelo pulchella Horsf., Trans. Linn. Soc., xiii, p. 175 (1821).

Type-locality: Java.

The typical form differs from that found in Tenasserim and the Malay Peninsula in having a broad chestnut collar on the hind-neck.

(1562) Carcineutes pulchellus amabilis.

The Pegu Banded Kingfisher.

Carcineutes amabilis Hume, Str. Feath., i, p. 474 (1873) (Pegu Hills); Blanf. & Oates, iii, p. 139.

Vernacular names. None recorded.

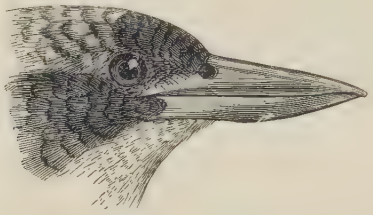

Fig. 44.—Head of *C. p. amabilis*. $\frac{2}{3}$.

Description.—Adult male. Broad frontal band, sides of head and neck deep chestnut; anterior crown and nape bright blue, with a black centre to each feather and white bases, both shining here and there through the blue; upper plumage and wings barred black and white with bright pale blue tips; tail banded black and blue, the blue bands edged with white on the outer webs; wing-quills black with broken white bars or notches on either web; chin and throat white; remainder of lower parts pale dull rufous; allescent on the abdomen and pure white on the under tail-coverts.

Colours of soft parts. Irides purple-grey; bill vermilion or coral-red; legs and feet dull pale green (*Davison*).

Measurements. Wing 82 to 89 mm.; tail 62 to 67 mm.; tarsus about 13 mm.; culmen 31 to 36 mm.

Female. The whole of the upper parts, wings and tail barred black and pale rufous, the bands broadest and brightest on the tail and wings, the two outermost primaries all black; below white with black edges to the feathers forming bars on the breast and flanks.

Distribution. Peninsular Burma and Siam and Malay States.

Nidification. Kellow's collectors took several clutches of eggs of this bird in 1908 from nesting-holes said by them to have been made in the banks of small streams in open forest on the outskirts of heavier jungle. Herbert's collectors took two other clutches, one in 1914 and the second in 1917, the first of which were placed in a hollow in a dead tree in open forest. Twenty eggs average 24·5 × 20·7 mm.: maxima **27·2 × 23·4** mm.; minima **22·0** × 20·8 and 23·0 × **18·8** mm.

The breeding-season lasts from February to May.

Habits. Very similar to those of *Caridagrus*, a forest bird frequenting both dense and open forest, sometimes on streams, sometimes far from any water. Davison found its food to consist chiefly of small lizards and various insects such as wood-lice etc.

Fig. 45.—*Dichoceros bicornis bicornis.*

Family BUCEROTIDÆ.

In the Hornbills the cæca are wanting; the oil-gland is tufted; the sternum has two shallow notches, one on each side in the posterior margin; behind the partly developed manubrium is a perforation as in the *Meropidæ*. Toes syndactylous; both carotids generally, but not always present; spinal feather-tract not defined on the neck, which has no lateral bare tracts or apteria; there is no after-shaft and no down on the featherless parts of the skin. There are eleven primaries and from ten to sixteen secondaries; the under wing-coverts do not cover the bases of the quills, a fact which accounts for the extraordinarily loud noise made by the larger Hornbills when flying. The tail-feathers number ten; the bill is always very large, sometimes enormously so, and is often furnished with a casque of varying shape and description. The eyelids are furnished with long eyelashes.

Young born naked and remaining so until the first plumage is acquired.

Sexes generally alike and when different, as in *Anorrhinus*, the young in their first plumage resemble the male, not the female.

Key to Genera.

A. Casque cellular, not solid; hind-neck and back feathered.
  a. Casque large in adults, as high, or higher than, the upper mandible.
    a'. Casque broad, concave above and ending anteriorly in two points .. DICHOCEROS, p. 283.
    b'. Casque compressed, ending in a single point ..... ANTHRACOCEROS, p. 286.
  b. Casque moderate, small or absent.
    c'. Casque low, broad and rounded above, composed of transverse ridges ..... RHYTICEROS, p. 290.
    d'. No casque but a few oblique ridges on sides of base of upper mandible. ACEROS, p. 294.
    e'. Casque small and compressed, the upper edge curving down in front.
      a''. Crest moderate, of ordinary feathers.
        a^3. Chin and throat naked..... ANORRHINUS, p. 296.
        b^3. Chin and throat feathered .... PTILOLÆMUS, p. 296.
      b''. Crest very large and loose-textured..... BERENICORNIS, p. 300.
    f'. Casque small, compressed and pointed, or wanting; no ridges on side of bill ..... LOPHOCEROS, p. 301.
B. Casque solid in front; neck all round and middle of back naked. Middle rectrices lengthened ..... RHINOPLAX, p. 305.

Genus **DICHOCEROS**.

Dichoceros Gloger, Hand- u. Hilfsb., p. 335 (1842).

Type, *Dichoceros cavatus* Shaw = *D. bicornis* Linn.

In the single species contained in this genus the size is very large. The bill is very large, stout and much curved; the casque is large and broad, covering more than the basal half of the culmen; the sides are flattened and vertical behind, the top overhanging in front; the posterior edge is broad and rounded, projecting over the head behind; the upper surface is flat or slightly convex behind, concave in front, terminating anteriorly in two lateral parts, blunted in old males. The feathers of the neck and nape are loose and long but there is no real crest; the chin is covered with feathers but there is a small bare orbital space; the tail is long and rounded.

Sexes alike.

(1563) Dichoceros bicornis bicornis.

THE GREAT HORNBILL.

Buceros bicornis Linn., Syst. Nat., 10th ed., i, p. 104 (1758) (Travancore).
Dichoceros bicornis. Blanf. & Oates, iii, p. 142.

Vernacular names. *Homrai* (Nepal); *Banrao* (H., Mussoorie); *Kugrong, Kudong* (Lepcha); *Garuda* (Kan.); *Garud* (Mahr.); *Malle Moraki* (Mal.); *Raj Dhanesh, Hivang* (Assam); *Ouk-chin-gyee* (Burm.); *Dao-yung* (Cachari); *Inrui-go* (Kacha Naga).

Description.—Male. Front of face, chin, throat to a point in line with the back of the casque black; whole of neck white, always more or less stained with yellow; back, rump, scapulars, breast and under wing-coverts black; wings black, the greater coverts tipped with white, primary coverts nearly all white; quills with white bases and white tips; tail white with a broad black sub-apical band; tail-coverts, thighs, vent and lower abdomen white.

Colours of soft parts. Iris crimson or deep red; bill wax-yellow; the base and a wedge-shaped patch on the sides of the casque black, the tip red and the culmen more or less suffused with orange; a black line from the casque along the edge of the culmen and the edges of the commissure also black; orbital skin fleshy-red, eyelids plumbeous; legs and feet slaty or greenish-slaty.

Measurements. Wing 500 to 552 mm.; tail 380 to 432 mm.; tarsus 73 to 75 mm.; culmen 330 to 375 mm.; longest casque 192 mm.; widest 106 mm.; highest 56 mm.

Female similar to the male but generally with a smaller bill and casque and no black except at the base and no red or orange tint.

Young birds have no casque but this commences to show the first autumn.

Distribution. South-West India along the Western coast from South Travancore to Bombay city; the Himalayas from Kuman to E. Assam; Tippera and Chittagong in Eastern Bengal, Burma, South-West Siam and the Malay Peninsula. The Sumatran bird seems to be separable on account of its small size, small bill and short deep casque. This form would bear the name of *D. b. cristatus* Vieill. (Nouv. Dict. d'Hist. Nat., p. 591, 1816: Batavia).

Nidification. Over the greater part of its habitat this Hornbill breeds in January and February but in the Himalayas most eggs are laid in March and April. They make no nest but lay two eggs, rarely one or three, in large natural hollows in lofty trees at great heights from the ground. The entrance to the hollow is gradually filled in, with the exception of an opening some four or five inches across, with the droppings

of the female bird, augmented sometimes, but not always, by the male bird with wet earth and remains of fruit, whilst it is also mixed with the seeds, rotten wood, etc., which adhere to the droppings. When dried this material becomes almost as hard as stone and has to be chipped away with an axe or heavy knife. The female remains in the nest-hole until the young are almost ready to fly, the male bird having to feed his whole family during this time. He does his duty manfully and by the time his wife and young are let out they are as fat as butter whilst he himself is very thin and exhausted. When released the female is often very bedraggled and dirty but as she moults and renews all her wing-quills whilst imprisoned she has no difficulty in flying. If, however, taken from the nest too early she may often be found bereft of her flight-feathers in great degree and unable to fly, as well as very stiff on her feet. When first laid the eggs are pure white, sometimes very faintly tinged with cream, but they soon become much stained by the wood on which they lie and then vary from pale buff or dirty yellowish to quite a deep yellow-brown. Forty-four eggs average 65·1 × 46·3 mm.: maxima **72·2** × 47·2 and 66·0 × **50·0** mm.; minima **59·8** × 47·8 mm. and 65·6 × **42·0** mm. According to the Hill-Tribesmen incubation takes 31 days.

Habits. The Great Hornbill is found from the level of the plains up to 3,000 feet, wandering some 2,000 feet higher than this, more especially in the Western Himalayas. In the Winter they are more or less gregarious and the flocks may number anything from half-a-dozen to forty. These flocks unite again very often at roosting-time and I once encamped near a huge Pepul-tree in which I counted over two hundred birds, flock after flock arriving from early dusk until nightfall. They are very noisy birds and even in the non-breeding season give vent to the most extraordinary rattling roars, cacklings and bellows and the total volume of sound at one of their roosting-trees must be heard to be realized. When flying, the wind rushing through the bare bases of their primaries makes a very loud droning sound which can be heard at an immense distance, often before the birds are visible themselves. They are almost omnivorous in their diet, though subsisting mainly on large fruit. Any small reptile, large insect, mice, rats, grain, etc., are welcomed and are eaten as are fruit—just picked up with the tip of the bill, jerked into the air, caught in the capacious throat and swallowed whole. When snakes are caught they are always well battered against stones or branches but I have never seen poisonous snakes devoured. They feed both on the highest trees, on low trees or on the ground. The natives say they pair for life and I have been shown nesting-sites occupied each year for a longer period than any villager could account for. They are probably birds which live to a very great age.

Genus ANTHRACOCEROS.

Anthracoceros Reich., Syst. Av., pt. xlix (1849).

Type, *Buceros malabaricus* Gmelin.

In this genus the casque is very high and large, sharp-edged and projecting in front, broader and carried back above the crown behind, the upper outline curved parallel with the commissure. The orbital skin and a patch on either side of the throat bare; the chin and middle of the throat feathered. The tail is long with the feathers graduated and the wings are short and rounded. The sexes differ only in the size and coloration of the bill and casque.

Only two species are found within Indian limits.

Key to Species.

A. Outer tail-feathers all white. Casque compressed and flat on the sides ..... *A. coronatus*, p. 286.
B. Outer tail-feathers black with white tips. Casque convex at the sides ..... *A. malabaricus*, p. 287.

(1564) Anthracoceros coronatus.

THE MALABAR PIED HORNBILL.

Buceros coronatus Bodd., Tabl. Pl. Enl., p. 53 (1783) (Malabar).
Anthracoceros coronatas. Blanf. & Oates, iii, p. 144.

Vernacular names. *Dhan churi* (Hind.); *Suliman murghi* (Deccani); *Bagma Dunesh* (Beng.); *Kuchla-Kha* (Uriya); *Wayera* (Mahr.); *Kanari* (Konean); *Peshta gonda* (Gond.); *Porowa Kaendetta*, *Atta Kaendetta* (Cing.); *Erana-Chandoo-kuravi* (Tamil, Ceylon).

Description.—Male. Lower breast, abdomen, tail-feathers except the central pair, under tail-coverts, edge of wing, concealed bases of primaries, tips to all but first two primaries and tips to outer secondaries white; remainder of plumage black glossed with green.

Colours of soft parts. Iris orange-red to red in males, brown or blue-brown in females; bill waxen-yellow, black at the base of both casque and true bill and also on the terminal half or two-thirds of the casque; in the female the black is less in extent and is absent on the back of the casque; the naked skin round the eye is black or blue-black in the males, white or fleshy-white in the females; the bare throat-patch is flesh-coloured; legs and feet slaty-grey, greenish-grey or dark grey.

Measurements. Wing 315 to 340 mm.; tail 295 to 335 mm.; tarsus about 65 mm.; bill from gape to tip 151 to 188 mm.

Female. Exactly like the male except, as described above, in the colours of the soft parts.

Measurements. Wing 295 to 328 mm.; bill 126 to 166 mm.

Young birds, *fide* Parker, have the black body-feathers barred with white or dull brownish-white and the bases of the outer tail-feathers black.

Distribution. Ceylon, Travancore, Bombay Presidency, Ratnagiri, Orissa, Bihar and Central Provinces. I cannot separate Ceylon birds from those of continental India, the measurements overlapping greatly and averaging hardly any smaller. It also occurs in Chota Nagpore and Western Bengal, where it overlaps the area occupied by *A. malabaricus*.

Nidification. There is very little on record about the breeding of this Hornbill, although it is common in Ceylon and Travancore. According to Parker it lays three or four eggs from March to June in hollows in high trees, the entrances being plastered up with the birds' droppings as is usual with this family. Three eggs in my collection measure 54·0×37·4, 55·0×36·2 and 56·2×41·3 mm. The third egg, an addled one taken with one young one, is stained a mahogany-brown. The texture is similar to that of the eggs of *D. b. bicornis* but less coarse and pimply.

Habits. This is a bird of dry deciduous forests in preference to the wetter evergreen ones, though it is occasionally found in the latter also. It generally occurs in small flocks of about a dozen, haunting the higher trees and living mainly on fruit, though it will eat almost anything *faute de mieux*. Its flight, like that of most of the smaller Hornbills, consists of alternate flappings and sailings and it makes quite a loud sound with its wings, though nothing like that of the Great Hornbill. Its cries are loud raucous cacklings and it is a very noisy bird.

Anthracoceros malabaricus.

Key to Subspecies.

A. Larger; wing over, ♂ 300 mm., ♀ 290 mm. ..... *A. m. malabaricus*, p. 288.
B. Smaller; wing under, ♂ 300 mm., ♀ 290 mm. ..... *A. m. leucogaster*, p. 289.

The names by which this species and its various subspecies have been known are very much intermixed.

Gmelin described his bird as coming from India and in naming it *malabaricus* evidently referred to a bird he thought occurred within the limits of that country, but the fact that it does not occur nearer to Malabar than N. Central India neither invalidates the name nor makes it applicable to any form found outside India. It certainly cannot be used for the Burmese form; nor is the name a synonym of *A. coronatus*, for Gmelin describes the outer tail-feathers of *malabaricus* as white-tipped only and not all white. *Albirostris* described by Nodder from Chandernagore and *affinis* described by Blyth from Dehra Dun are both synonyms of

malabaricus. Fortunately the name *leucogaster* of Blyth refers definitely to a bird procured by Mr. Bart in Tenasserim and is therefore available for the Burmese form.

(1565) Anthracoceros malabaricus malabaricus.

THE LARGE INDIAN PIED HORNBILL.

Buceros malabaricus Gmelin, Syst. Nat. i, p. 359 (1788) (Malabar, *in errore*, Chandernagore).
Anthracoceros albirostris. Blanf. & Oates, iii, p. 145 (part).

Vernacular names. *Hay-tuk-tek-ee*, *Kao-Dhanesh* (Assam); *Ouk-khyen* (Burmese); *Dao-yung-kashiba* (Cachari).

Fig. 46.—Head of *A. m. malabaricus*.

Description.—Male. Differs from *A. coronatus* only in having the outer tail-feathers white on the terminal quarter and black elsewhere.

Colours of soft parts. Iris red-brown to blood-red; orbital skin-milk-blue to pale purplish-blue; throat-patch duller, more fleshy-blue; casque and bill wax-yellow, a black patch running from the fore part of the casque to the centre of the join between casque and upper mandible; extreme bases of casque and bill and commissure black; legs and feet dull, dark slate, or greenish-slate.

Measurements. Wing 310 to 315 mm.; tail 259 to 289 mm.; culmen 126 to 149 mm.; tarsus about 60 mm. Unsexed specimens have wings between 291 and 322 mm.

Female is much smaller than the male and has the whole of the fore part of the casque, the top and upper part of the upper mandible, the commissure and bold streaks on the lower mandible black; the amount of black varies considerably but is always much more extensive than in the male. The iris is brown or grey-brown.

Measurements. Wing 288 to 301 mm.; culmen 108 to 122 mm. With much smaller casque.

Colours of soft parts. Iris brown; bill wax-yellow, the fore part

of the casque, upper and lower mandible and commissure black in varying extent.

Young birds are like the adult, but the bill is small and all waxy-yellow; the casque commences to grow when the bird is about 8 months old but takes two to three years to fully mature.

Distribution. From the Siwalik Hills and Dehra Dun to Bihar; Western Bengal as far East as Midnapore and Chota Nagpore and Purulia; Assam birds and those from the Chin Hills, Kachin Hills and extreme Northern Burma are intermediate, as would be expected, between this and the next form but should, perhaps, be placed with this on account of their very large bills, which run up to 149 mm.

Nidification. Whymper found the Pied Hornbill breeding in Kuman during April, laying their eggs in hollows in high trees in deciduous forest. In Cachar most eggs are laid in March but I found eggs, just hatching, as late as the 25th May, whilst Primrose took one in the Tezpur district of Assam on the 3rd of that month quite fresh. The tree selected is generally one in scattered deciduous forest, mixed bamboo-jungle or in secondary growth and the natural hollows in which the eggs are laid are always very high up, seldom lower than forty feet from the ground. The aperture is sealed up in the usual Hornbill manner but sometimes leaves a hole big enough for the hen to put out her whole head. Eleven eggs average 50·0 × 35·4 mm.: maxima **54·0 × 38·0** mm.; minima **47·4** × 33·7 mm. and 49·0 × **33·2** mm. The texture is coarse and porous but less corrugated and pimply than those of either of the preceding birds.

Habits. The Pied Hornbills collect in very large flocks during the non-breeding season, feeding both on the fruit of the highest and lowest trees and also on the ground on snails, worms, reptiles and insects. Inglis saw them catching and eating fish and Wardlaw Ramsay and I have both taken small snakes from their stomachs. Their flight is similar to that of the preceding bird and in most ways the two are very similar. On the ground their actions are very awkward and they progress by alternate leaps and little runs but when hurried or frightened they at once take to their wings. They are noisy birds and when one member of a flock speaks every other individual at once noisily expresses its own feelings on the subject. A captive bird in a Naga village was said to have lived over thirty years.

(1566) Anthracoceros malabaricus leucogaster.

THE BURMESE PIED HORNBILL.

Buceros leucogaster Blyth, J. A. S. B., x, p. 922 (1841) (Tenasserim).
Anthracoceros albirostris. Blanf. & Oates, iii, p. 145 (part).

Vernacular names. *Ouk-khyen* (Burmese).

Description. Only differs from *A. m. malabaricus* in being smaller.

Colours of soft parts as in the preceding bird.

Measurements. Wing, ♂ 262 to 290 mm., ♀ 245 to 286 mm.; tail 225 to 266 and in one case 290 mm.; culmen, ♂ 98 to 135 mm., ♀ 92 to 122 mm.

Distribution. The whole of Burma, except the extreme North, to the extreme South of Tenasserim; East to Siam, Annam and Cochin China.

Nidification. In Pegu Oates obtained eggs just hatching or hard-set in the end of March and Bingham took several during the same month in Tenasserim. In the Southern Shan States Cook took two single fresh eggs on the 20th and 27th March, so possibly they breed later in the North than in the South. The natural holes selected as nests are invariably at great heights, varying between 50 and 100 feet from the ground, whilst the favourite trees seem to be a *Bombax*, *Lagerstræmia* or *Dipterocarpus*, giants which tower over their surrounding jungle of smaller deciduous trees or the secondary growth of deserted cultivation. They apparently lay two or three eggs only, though the natives say four. Fourteen eggs average 44·0×34·1 mm.: maxima **52·0**×35·0 and 47·2×**35·6** mm.; minima **43·1**×35·0 and 44·6×**32·2** mm.

Habits. These differ in no way from those of the preceding bird.

Genus **RHYTICEROS.**

Rhyticeros Reich., Syst. Av., pl. 1 (1849).

Type, *Rhyticeros undulatus* Shaw.

In this genus the casque is small, rounded and corrugated in appearance, being composed of plates the upper edges of which form alternate ridges and furrows; the bases of both mandibles are ridged in one species, smooth in the others; the chin and throat is naked, forming a pouch which is capable of great inflation; the feathers of the crown are long and loose, forming a rough crest. The sexes differ in coloration.

Key to Species.

A. Base of both mandibles with transverse ridges ..... *R. undulatus*, p. 291.
B. Base of both mandibles smooth.
a. Larger; wing over 400 mm. ..... *R. subruficollis*, p. 292.
b. Smaller; wing under 350 mm. ..... *R. narcondami*, p. 293.

(1567) Rhyticeros undulatus.

THE MALAYAN WREATHED HORNBILL.

Buceros undulatus Shaw, Gen. Zool., viii, p. 26 (1811) (Java).
Rhytidoceros undulatus. Blanf. & Oates, iii, p. 147.

Vernacular names. *Mah-do-la* (Assamese); *Dao-rai* (Cachari).

Description.—Male. Line across forehead, passing down centre of crown and widening posteriorly to include the whole of the crest deep purple-chestnut; hind-neck from below crest black; sides of crown, head and neck and fore-neck white, more or less suffused with buff, especially where meeting the chestnut crest; tail white, always stained with yellow or buff; remainder of plumage black glossed with deep steel-green.

Fig. 47.—Head of *R. undulatus.* ¼.

Colours of soft parts. Iris orange-red to blood-red; orbital skin dull red to brick-red; bill wax-yellow tinged with dull orange at the base, the corrugations at the base of both mandibles dark reddish in the hollows; casque dull yellow with dark reddish furrows; gular skin bright yellow to orange-yellow with a broad transverse black band, generally interrupted in the centre; legs and feet greenish- to blackish-slate.

Measurements. Wing 458 to 505 mm.; tail 300 to 330 mm.; tarsus 60 to 70 mm.; culmen, ♂ 202 to 219 mm., ♀ 178 to 198 mm.

Female. Tail white, remaining plumage black, glossed as in the male.

Colours of soft parts. Gular skin bright dark blue with a black band as in the male; iris brown or grey-brown; bill yellow with no red tinge.

Distribution. Assam, South of the Brahmaputra; Tippera and Chittagong hill tracts in Eastern Bengal; practically the whole of Burma to Singapore; Sumatra, Java and Borneo.

Nidification. Eggs of this Hornbill were taken by Theobald near Sandoway in February whilst in Tenasserim Bingham took five nests during February and the first half of March. Since then both Mackenzie and Hopwood have found others during February

and March in South Tenasserim. The nidification of this bird is exactly like that of the Great Hornbill and requires no further description but in North Cachar I found it breeding not uncommonly during March at an elevation of nearly 5,500 feet. Here it always selected one of a clump of an enormous tree which grew in otherwise very stunted oak-forest. In consequence, when on a ridge the nest was often visible from an immense distance. The eggs only differ from those of the Great Hornbill in being much smoother. They lay two or three eggs, sometimes only one. Twenty-four average 62·0×43·2 mm.: maxima **72·1×43·7** and 69·9×47·1 mm.; minima **49·5×38·0** mm.

I obtained one clutch of eggs in June but the Nagas told me they had taken young birds from the same nest in the previous April.

Habits. Much the same as those of *D. b. bicornis* but it never collects in such large flocks and though capable of emitting equally loud and raucous cries, is not nearly so noisy a bird. Its flight may be heard at some distance but is never so loud as that of the Great Hornbill. It has a hoarse, low double note, very deep, a sort of grunt, audible at some distance. At certain times of the year in Assam this Hornbill visits the pepul and other fig-trees which are in fruit in great numbers and these trees are leased out to certain shikaries, who kill the birds and sell their flesh as medicine. One such shikari told me that he had got as many as 80 birds in a season from one great fig-tree and that he seldom got less than 40. The bazaar price was up to two or three rupees each. It is undoubtedly principally a fruit-eater but I have taken remains of tree-frogs, bats and lizards from their stomachs.

(1568) Rhyticeros subruficollis.

BLYTH'S WREATHED HORNBILL.

Buceros subruficollis Blyth, J. A. S. B., xii, p. 177 (1843) (Tenasserim).
Rhytidoceros subruficollis. Blanf. & Oates, iii, p. 148.

Vernacular names. None recorded.

Description. Differs from the preceding bird only in being much smaller, in having no grooves or corrugations on the sides of the upper and lower mandibles and no black bar across the gular skin.

Colours of soft parts as in *R. undulatus*, but without the dark bar across the gular pouch.

Measurements. *Male.* Wing 420 to 445 mm.; tail 252 to 270 mm.; tarsus 55 to 59 mm.; culmen 196 to 205 mm.

Distribution. Southern Burma from Arakan to the extreme South of Tenasserim, South-West Siam (almost certainly Malay States), Sumatra and Borneo.

Nidification. Similar to that of the preceding bird. Theobald says it lays in the third week of February. Bingham took nests in Tenasserim during March and Oates, in Pegu, on the 22nd of that month. Later, both Hopwood and Macdonald took eggs in February near both Tavoy and Amherst. Nine eggs average 57·3×43·8 mm.: maxima **60·3**×46·5 and 60·1×**47·0** mm.; minima **52·9**×**38·5** mm.

Habits. Exactly the same as that of *R. undulatus*. Davison describes their flight-sound as a "resonant swish which can be heard at an incredible distance." It is a much higher-pitched sound than the deep drone made by the wings of the Great Hornbill. Its call is said to be a short, hoarse bark made both when flying and when feeding.

(1569) Rhyticeros narcondami.

THE NARCONDAM HORNBILL.

Rhytidoceros narcondami Hume, Str. Feath., i, p. 411 (1873) (Narcondam I.); Blanf. & Oates, iii, p. 149.

Vernacular names. None recorded.

Description.—Male. Head deep rich rufous, fore-neck paler rufous, deepening again on the extreme upper breast; tail white; remainder of plumage black, the upper plumage and tail strongly glossed with green, the lower plumage faintly so.

Colours of soft parts. Iris pale red to blood-red; bill waxy-yellow, the base of both mandibles brownish blood-colour; grooves of casque dark brown; orbital skin bright smalt-blue; gular skin white tinged with greenish-blue or smalt-blue; legs and feet black with yellow soles. Cory gives the colour of the iris as brilliant orange-red, with an inner fine circle of pale yellow.

Measurements. Wing 303 to 305 mm.; tail 195 to 198 mm.; tarsus 46 to 50 mm.; culmen 121 to 126 mm.

Female. Tail white; remainder of plumage black, glossed with green.

Colours of soft parts as in the male.

Measurements. Wing 285 to 287 mm.; tail 180 to 182 mm.; culmen 188 to 200 mm.

Distribution. Narcondam Island.

I retain this little Hornbill as a full species as there is no intergrading in size but some systematists might consider it to be a small island race of *R. plicatus*, of which *R. plicatus everetti* from the Moluccas is an intermediate form.

Nidification. Unknown. Cory found this Hornbill paired and the cocks busy feeding the hens on the 22nd March but they had not started laying at that time.

Habits. Osmaston records that he found these birds fairly numerous on the high forests covering the lower slopes of the

central mountain down to the coast. He estimates their total number at about 200. He found them very noisy and apparently utterly fearless, for standing under the huge fig-trees, the fruit of which they feed upon, he shot 10 specimens and could have killed ten times that number. Hume describes their flight as heavy and slow.

Genus ACEROS.

Aceros (Hodgs.) Gray, Zool. Misc., p. 85 (1844).

Type, *Buceros nepalensis* Hodgs.

This genus is distinguished by having no true casque, though the basal portion of the upper mandible is thickened and sometimes shows a small growth as if of an incipient casque; the sides of the upper mandible are grooved in the adult; the cheeks, chin and throat are naked; the tail is long and graduated; the feathers of the head are long and loose-textured, forming a bushy hair-like crest.

Sexes dissimilar.

(1570) Aceros nepalensis.

THE RUFOUS-NECKED HORNBILL.

Buceros nepalensis Hodgs., As. Res., xviii, p. 178 (1829) (Nepal).
Aceros nepalensis. Blanf. & Oates, iii, p. 149.

Vernacular names. *Dao-yuny gajao, Dao-wah* (Cachari); *Kolep* (Lepcha).

Fig. 48.—Head of *A. nepalensis.* ½.

Description.—Male. Whole head, neck and breast rufous, changing to deep rufous-maroon on the abdomen, flanks and vent and to black and maroon on the lower tail-coverts; outer primaries tipped white, the outermost all black and the next one often only mottled with white at the tip; terminal half of tail white; remainder of plumage black glossed with dark green.

Colours of soft parts. Iris blood-red; bill wax-yellow, the grooves dark brown to black or "chestnut" (*Jerdon*); orbital and

facial skin bright pale blue; gular skin bright scarlet; legs and feet brownish- or greenish-black.

Measurements. Wing 445 to 470 mm.; tail 395 to 458 mm.; tarsus about 74 mm.; culmen 215 to 240 mm.

Female. Wings and tail marked with white as in the male; remainder of plumage black glossed with green except on the head and crest.

Colours of soft parts. Iris brown or dull bluish; facial skin dull pale blue.

Measurements. Wing 434 to 440 mm.; culmen 188 to 200 mm.

Young birds are like adults of the same sex but with much smaller ridgeless bills.

Distribution. Sub-Himalayas from Nepal to Eastern Assam; Cachar, Manipur, Lushai, Burmese Hills from Kachin Hills and Kareuni to Mt. Muleyit in Tenasserim. It occurs in Siam and de la Cour obtained it in Annam.

Nidification. Gammie obtained an addled egg of this species from a hole in a tall Dysoxylon-tree on the 20th May and a second from the same hole the following year on the 28th April. In North Cachar and the adjoining part of the Khasia Hills I found it breeding in February–March and again in May and June, the Nagas having taken the young one of the first brood. Most of the nesting-holes were in large trees in evergreen but not very dense forest at an elevation between 3,000 and 5,500 feet, but I also found it breeding occasionally in scattered oaks on grass-land at about 2,000 to 2,500 feet. It seems generally to lay but one egg, less often two. In appearance they are like those of *R. undulatus* and twelve average 59·2 × 43·1 mm.: maxima **68·0** × 44·5 and 63·2 × **46·5** mm.; minima **54·3** × **40·0** mm.

The nest-hole is plastered up in the usual manner but I found the entrance larger than it is in the nest-holes of *D. b. bicornis*, so that the bill of the female could be put well through it to receive food from the cock.

Habits. Except that it keeps more to evergreen forest and to higher elevations, generally over 2,000 feet and up to 6,000, the habits of this species are similar to those of the Wreathed Hornbill. In flight it makes nearly as much noise as the Great Hornbill but the sound is high-pitched and less regular. As far as I know it is purely a fruit-eater. It has a deep double croak or grunt but in the breeding-season the male, and I think the female also, emits the most discordant roars and cacklings and at this time the male shows off to his mate with really appalling noises. He does this perched on a large bough, his head thrown back, red hair on end, his gular shin inflated and his bill held erect and wide open. His wings hang loosely and slightly quivering, whilst every now and then his long tail is jerked up until it almost touches his head.

Genus ANORRHINUS.

Anorrhinus Reich., Syst. Av., pl. xlix (1849).

Type, *Buceros galeritus* Temm.

In *Anorrhinus* there is a small casque, compressed, sharp-edged and with the upper ridge parallel with the culmen, posteriorly curved downwards in front; both mandibles are serrated, strongly in adults, obsoletely in the young; chin and throat naked; the crest is well developed and is composed of normal feathers; tail-feathers slightly graduated; sexes alike.

(1571) Anorrhinus galeritus.

THE BUSHY-CRESTED HORNBILL.

Buceros galeritus Temm., Pl. Col., pl. 520 (1824) (Sumatra).
Anorrhinus galeritus. Blanf. & Oates, iii, p. 151.

Vernacular names. None recorded.

Description. Basal two-thirds of the tail brownish-grey; remainder of plumage black, glossed with green on the wings and upper plumage and becoming browner on the breast and abdomen and still paler about the vent and on the under tail-coverts.

Colours of soft parts. Iris blood-red in the male, red-brown or grey-brown in the female; bill black; orbital and gular skin pale blue; angle of gonys, base of throat and eyelids mottled black and white; legs and feet black.

Measurements. Wing about 375 to 390 mm.; tail about 270 to 285 mm.; tarsus about 50 mm.; culmen 100 to 135 mm.; females are rather smaller than males.

Young birds have pale buff edges to the feathers of the wings, except primaries, and scapulars; the bill is much smaller with the base yellowish-white.

Distribution. Tenasserim from Nwalabo, throughout the Malay Peninsula to Sumatra and Borneo.

Nidification. Unknown.

Habits. Except Davison's account of 50 years ago there is nothing on record of this Hornbill's habits. He records it to be a bird of dense forests only, keeping entirely to high trees, very shy and difficult to approach and feeding, so far as is known, entirely on fruit. The call is said to be like that of *Anthracoceros*.

Genus PTILOLÆMUS.

Ptilolæmus Ogilvie-Grant, Cat. B. M., xvii, p. 392 (1892).

Type, *Buceros tickelli* Blyth.

The genus *Ptilolæmus* differs from *Anorrhinus* principally in having the throat well feathered; the casque is small, compressed

and sharp-edged; feathers of head normal, lengthened posteriorly and forming a full crest. Sexes dissimilar.

Key to Subspecies.

A. Central tail-feathers tipped with white..... *P. t. tickelli*, p. 297.
B. Central tail-feathers not tipped with white .. *P. t. austeni*, p. 298.

(1572) Ptilolæmus tickelli tickelli.

TICKELL'S HORNBILL.

Buceros tickelli Blyth, J. A. S. B., xxiv, p. 266 (1855) (Tenasserim).
Ptilolæmus tickelli. Blanf. & Oates, iii, p. 151.

Vernacular names. None recorded.

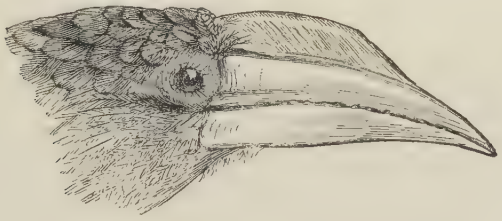

Fig. 49.—Head of *P. t. tickelli*. ⅓.

Description.—Male. A small black line of feathers under the orbital bare patch; behind this a rufous patch; forehead, crown and nape pale dull grey-brown, each feather with a more rufous edge and a whitish shaft-stripe; back, scapulars, rump, upper tail-coverts and wing dark brown, the newly-moulted feathers with tiny dark edgings; upper tail-coverts tipped with rufous, and greater wing-coverts with pale dull rufous; primary coverts black, glossed with green and tipped with white; quills black, the primaries glossed with green, tipped with white and edged with buff on the centres of the outer webs; inner secondaries like the back but with mottled white tips; middle tail-feathers like the back and outer tail-feathers black with a green gloss, all tipped with white; sides of neck and lower plumage rufous, palest on the fore-neck and changing to dark brown on the flanks, axillaries and under wing-coverts.

Colours of soft parts. Iris bright brown; bill in male yellowish-white, tipped with black in younger birds, with a saffron-yellow patch on either side at the base; in the female the whole bill is dark dull brown; orbital skin bluish-white to bright blue; legs and feet brownish-black.

Measurements. *Male*: Wing 302 to 314 mm.; tail 280 to

303 mm.; tarsus 46 to 48 mm.; culmen 113 to 127 mm. *Female*: wing 297 to 314 mm.; culmen 113 to 121 mm.

Female. Sides of the neck concolorous with the crown; lower surface darker and duller, more brown and less rufous; the pale markings on the wing-quills are smaller and those on the coverts absent.

Distribution. Only known from Tenasserim.

Nidification. Bingham collected a very fine series of eggs of this Hornbill during February and March nearly fifty years ago in Tenasserim but since that time only Messrs. Hopwood and Mackenzie have succeeded in finding them. Unlike most Hornbills these birds generally select holes in trees quite low down in which to deposit their eggs, one such found by Bingham being only twelve feet from the ground and most under twenty-five. The entrance is closed up in the same way as those of other Hornbill's nest-holes. Three seems to be the normal number of eggs laid, occasionally as many as five. Twenty-two average 46·4 × 33·8 mm.: maxima **51·2** × 32·2 and 48·2 × **35·5** mm.; minima **42·3** × 32·6 and 44·1 × **32·2** mm.

Habits. This is a Hornbill of dense forests, preferably those which are more or less evergreen but also those which are deciduous. They keep much to the higher trees and, except in the breeding-season, are said to be very wild and difficult to approach. In the breeding-season, however, Bingham notes that they become strangely tame. In voice and flight they are said to closely resemble the Pied Hornbill but the flight is practically noiseless. They have not been observed feeding on the ground and, as far as is known, they are purely fruit-eaters. Davison remarks on the curious follow-my-leader habit of this Hornbill, each bird following in the same line and in the same manner as the first whenever they move from one place to another.

(1573) Ptilolæmus tickelli austeni.

GODWIN-AUSTEN'S HORNBILL.

Anorrhinus austeni Jerdon, Ibis, 1872, p. 6 (North Cachar Hills).
Ptilolæmus austeni. Blanf. & Oates, iii, p. 153.

Vernacular names. *Dao-yung-lai* (Cachari).

Description.—Male. Differs from the preceding bird in having no white tips to the central tail-feathers; the sides of the head, chin and throat are almost pure white and the fore-neck a very pale rufous; the pale markings on the wings are less in extent, the coverts, as a rule, having no rufous edgings; the under surface is much the same as in *P. t. tickelli*.

Colours of soft parts. Iris dull brown; bill and casque dull wax-yellow, reddish-yellow on the sides near the base; orbital skin

pale yellow; legs dull horny-green, sides dull dirty yellow; claws dusky black.

Measurements. Wing 312 to 337 mm.; tail 281 to 297 mm.; tarsus 49 to 50 mm.; culmen 121 to 135 mm.

Female. Similar to that of Tickell's Hornbill but much darker, more grey-brown below with little or no rufous on the fore-neck and upper breast; the bill is coloured as in the male but paler and is not brown as in *P. t. tickelli*.

Measurements. About the same as in the male.

Young females sexed both by myself and by Peddie in North Cachar as well as by Dr. Coltart in Lakhimpur, were in plumage similar to that of the male and I have on doubt as to the correctness of our sexing.

Distribution. Throughout the hill ranges of Assam, South of the Brahmaputra from the North of North Cachar to the extreme East of Assam round about Margherita. I saw it once in the Jetinga Valley in the South of North Cachar and Hume thought he observed it in Manipur.

Nidification. I first took this bird's egg on the 19th May, 1893, in North Cachar and subsequently Coltart and I had many birds brought to us with their eggs taken round about Margherita in Eastern Lakhimpur. The nest-holes, some of which we visited, were large natural hollows in biggish trees but not very high up. The highest we saw was about 25 feet up but, according to the Nagas, two others were at a very great height. Others we saw varied between 15 and 20 feet. The full clutch seems to be three eggs, sometimes two and, it is said, rarely four or even five. Twenty-four average 48·8×34·2 mm.: maxima **57·0**×34·1 and 49·3×**35·4** mm.; minima **46·0**×**3·30** mm.

Habits. This is a very common Hornbill in the extreme East of Assam both in the plains immediately next the hills and in the hills themselves up to 2,000 and less commonly 1,000 feet higher. I once met with them at an elevation of about 3,600 feet but this was a most exceptional occurrence and possibly they were enticed to this height by the fact that a large area of bamboo was seeding, an event which brings together a vast assemblage of seed-eating birds. The flocks number from half-a-dozen up to forty or more and these often mix with flocks of Pied Hornbills. The two are not unlike in habits but we never saw Austen's Hornbill on the ground and those we examined had fed almost exclusively on fruit, seeds and shoots. A few had eaten insects and one had eaten two small tree-frogs. Their voice is like the cackling of the Pied Hornbill but much softer and they have a call, peculiar to themselves, not unlike the subdued trumpet of a Peafowl. The flight consists of alternate flappings and sailings, the noise caused being a soft whirring easily recognized when once heard.

Genus **BERENICORNIS.**

Berenicornis Bonaparte, Consp. Gen. Av., i. p. 9 (1850).

Type, *Buceros comatus* Raffles.

This genus contains a single species distinguished by long, loose-textured and hair-like feathers on the lores, which are directed upwards and forwards; there is a full crest of similar hair-like feathers; the bill is large, curved and compressed, the casque similar to that in *Anorrhinus* but much smaller: the tail is long with the central feathers greatly exceeding the others. Sexes dissimilar.

(1574) **Berenicornis comatus.**

THE LONG-CRESTED HORNBILL.

Buceros comatus Raffles, Trans. Linn. Soc., xiii, p. 339 (1822) (Sumatra).
Berenicornis comatus. Blanf. & Oates, iii, p. 153.

Vernacular names. None recorded.

Description.—Male. Head, neck, breast and upper abdomen, tips of the primaries and outer secondaries, a patch inside the shoulder of the wing and the whole tail white, generally sullied and yellowish with an oily secretion; remainder of plumage black, the quills and greater coverts with a faint greenish gloss.

Colours of soft parts. Iris wax-yellow; facial skin deep, dull blue; bill dull black, mottled at the base of both mandibles with horny-green or yellowish-green; legs and feet black.

Measurements. Wing 385 to 462 mm.; tail 365 to 488 mm.; tarsus about 66 mm.; culmen 137 to 184 mm.; greatest depth of bill 56 mm.

Female similar to the male but with the lower plumage, sides and back of neck all black; the white feathers of the head have black shafts.

Young birds are like the female but have black bases to all the white feathers and the tail is black with white tips.

Distribution. Tenasserim from Nwalabo, South-West Siam, Malay Peninsula, Sumatra and Borneo.

Nidification. Unknown.

Habits. This Hornbill keeps entirely to forest with dense undergrowth, keeping much to this and to the ground, where it feeds on fruit, lizards, small birds, etc. It keeps in small parties and is said to be very shy, whilst the flight, unlike that of most Hornbills, is almost noiseless, consisting of continuous rapid flapping of the wings without the alternate sailings with outspread wings. The call is said to consist of a single soft "Hoo" as they start in flight and, whilst moving about, of the same sound rapidly repeated twelve or fourteen times.

Genus **LOPHOCEROS.**

Lophoceros Hempr. & Ehr., Symb. Phys. Av., fol. 2, footnote 8 (1828).

Type, *Buceros nasutus* Linn. *Habitat*, Africa.

Blanford (Avifauna, iii, p. 154) has shown that the reasons given by Hume for separating our Indian forms from the African genus *Lophoceros* do not hold good and that therefore his name *Ocyceros* must be rejected.

In the genus *Lophoceros* the casque is sometimes present, when it is small and compressed, terminating anteriorly in a point, or is absent; the bill is considerably curved and carinate above; the tail is long and graduated in our Indian species.

Sexes alike.

Key to Species.

A. Bill with small, keel-shaped casque ..... *L. birostris*, p. 301.
B. Bill with no casque ..... *L. griseus*, p. 303.

(1575) **Lophoceros birostris.**

THE COMMON GREY HORNBILL.

Buceros birostris Scop., Del Flor. et Faun. Insubr., ii, p. 87 (1786) (Coromandel).
Lophoceros birostris. Blanf. & Oates, iii, p. 155.

Vernacular names. *Char-kotra*, *Dhanmar*, *Dhaud*, *Dhanel*, *Lamdar* (Hind.); *Selagilli* (Hind. at Saugor); *Puttial Dhanesh* (Beng.); *Rundu-mukala-guwa* (Tel.); *Munu-mukala-kaka*, *Irawache* (Tam.).

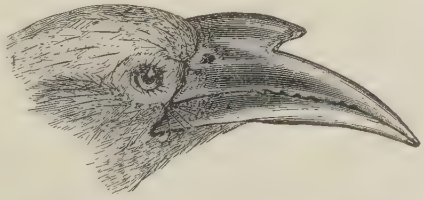

Fig. 50.—Head of *L. birostris*. ⅓.

Description. Upper parts and exposed portions of closed wing light brownish-grey, darkest on the crown; tail browner with white tips and a broad subapical band of black glossed with green; wing-quills black, all but the first two tipped with white; inner secondaries like the back; a broad but indistinct supercilium whitish; ear-coverts dark brown; chin, cheeks, throat and fore-neck grey, paling on the breast and flanks and becoming almost white on the abdomen, vent, thighs and under tail-coverts.

Colours of soft parts. Irides red or red-brown in the male, brown in the female; casque black or blackish-brown; base of bill black, running up the commissure to a point, rest of bill pale waxy-yellow or whitish; legs and feet dark plumbeous or slaty.

Measurements. Wing 211 to 228 mm.; tail 264 to 302 mm.; tarsus 45 to 46 mm.; culmen 87 to 112 mm.; greatest depth 47 mm.

Female differs only in having a smaller casque, of which the lengthened anterior point is small or wanting.

Young birds are like the female but have no casque, and the bill almost wholly yellow. The white tips to the primaries are wanting.

Distribution. From the base of the Himalayas, throughout the better-wooded parts of the Indian Peninsula, except on the Malabar and Travancore coasts; it does not occur in Sind, the Punjab and the greater part of Rajputana but has been found on Mt. Abu; it extends to Western Bengal and Bihar but not to Eastern Bengal or Assam.

Nidification. The Common Grey Hornbill breeds in open country, orchards and even in gardens, selecting nest-holes in large trees either high up or low down so long as the hole itself is suitable. Mr. Horne, quoted in 'Nests and Eggs,' gives an admirable account of its nesting, taken from observations made on a pair breeding in his own garden. The entrance to the hole was filled in by the female with droppings entirely from within the hole, using her bill as a trowel to do the plastering. From the day the hole was selected and the hen bird entered she did not again leave and was fed entirely by the male through the slit left in the masonry, which measured a finger's breadth and two or three fingers in height. The eggs number two or three and thirty of them average 41·9 × 30·0 mm.: maxima **46·0 × 32·6** mm.; minima **39·1** × 29·2 and 39·2 × **27·5** mm. The texture is similar to that of other Hornbills but finer and less pimply on the surface. For their size they are rather fragile eggs.

Habits. This Hornbill differs from most others in being a bird of the open country and though it may sometimes be found in thin deciduous forest it is never met with in dense, humid or evergreen forest. It is a familiar bird, haunting compounds, the surroundings of towns or villages and all open country in small flocks, its harsh cackles and cries being a common sound well known to all. Its flight is typical of the family, consisting of the usual rapid wing-flaps, alternated by short sailings with wings stiffly outspread. It is not, however, very noisy, though the swish of the wings may be heard at a short distance. It is mainly a fruit-eater but also indulges in all kinds of large insects and probably also small reptiles.

Lophoceros griseus.

Key to Subspecies.

A. Underparts grey; second pair of tail-feathers all, or nearly all, black ..... *L. g. griseus*, p. 303.
B. Underparts paler grey; second pair of tail-feathers with broad white tips ..... *L. g. gingalensis*, p. 304.

(1576) Lophoceros griseus griseus.

THE MALABAR GREY HORNBILL.

Buceros griseus Lath., Ind. Orn., i, p. 147, 1790 (Novo Hollandie, *in errore*; Malabar).
Lophoceros griseus. Blanf. & Oates, iii, p. 156.

Vernacular names. *Kaldal - Haki* (Can.); *Pottu mūnga* (Travancore).

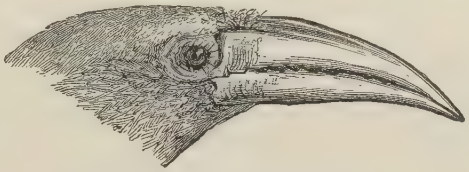

Fig. 51.—Head of *L. g. griseus.* ⅓.

Description. A broad indefinite superciliary stripe whitish; crown dark grey with central pale streaks to each feather, becoming broader on the sides and anterior crest and on the neck; upper parts slate-grey, with a tinge of brown and faint grey-green gloss; primaries black with broad white tips; tail black, all but the two central pairs with broad white tips; ear-coverts dark grey-brown streaked paler; chin greyish-white; throat, fore-neck and upper breast grey, tinged with brown and streaked with whitish; lower breast and abdomen rather paler grey; vent and under tail-coverts rufous-buff.

Colours of soft parts. Iris red-brown; orbital skin black; bill horny-yellow with a brownish-red tinge on all but the tip in the male; in the female it is waxy-yellow with black patches on the culmen and on the base of the lower mandible; legs and feet greenish-slate to greenish-black.

Measurements. Wing 205 to 220 mm.; tail 219 to 235 mm.; tarsus 44 to 45 mm.; culmen 100 to 110 mm., depth about 40 mm.

Distribution. South-West India from South Travancore to Khandesh.

Nidification. Bourdillon, Stewart and Davidson record the breeding-season of this Hornbill as lasting from January to April,

inclusive, and the nesting is in every way similar to that of the preceding bird. The normal full clutch seems to be three, but Stewart took several of four in Travancore. Thirty eggs average 41·4 × 30·0 mm.; maxima **42·4 × 31·0** mm.; minima **35·5 × 27·0** mm.

Davidson found it breeding as far North as Kanara.

Habits. According to Bourdillon this is a Hornbill of the open deciduous forest between 1,000 and 4,000 feet, more common above than below 2,000 feet. It also frequents clearings, such as tea estates and rice cultivation and is a familiar bird wherever found. Its voice, flight and diet are the same as those of the Northern Grey Hornbill.

(1577) Lophoceros griseus gingalensis.

THE CEYLON GREY HORNBILL.

Buceros gingalensis Shaw, Gen. Zool., viii, p. 37 (1811) (Ceylon).
Lophoceros gingalensis. Blanf. & Oates, iii, p. 157.

Vernacular names. *Kaendetta* (Cing.).

Description. Similar to the preceding bird but a much paler grey below and with much more white on the outer tail-feathers, the three outer pairs of which become pure white in old birds.

Colours of soft parts. Iris red in the male, brown in the female; bill in the male yellowish-white, with a black patch on either side of the lower base of the upper mandible and another, fainter streak on the lower mandible; in females the bill is mostly black with a long ivory-white patch along the lower half of the upper mandible; legs and feet greenish-plumbeous.

Measurements. Wing 193 to 211 mm.; tail 188 to 220 mm.; tarsus 40 to 41 mm.; culmen 75 to 97 mm., greatest depth 37 mm.

The bills of this and the last subspecies differ slightly: *L. g. griseus* has a groove in which the oval nostril is situated; *L. g. gingalensis* has no groove and has the nostril rounder. Again, in old males of the former the base of the bill has a deep reddish-horny incrustation of which there is but rarely any indication at all in the latter. These differences, however, do not appear to be of generic value.

Distribution. Ceylon only.

Nidification. There is nothing on record about the breeding of this Hornbill but Jenkins took eggs for me from a natural hollow in a dead palm on the 10th March. The entrance had been closed with "clay," probably droppings only, leaving an aperture just big enough for the tip of the female's bill to receive fruit from its mate. The three eggs measure 39·0×22·9, 37·4 × 21·0 and 38·3×29·0 mm.

Habits. This is a common bird in the heavier forests of Ceylon

from the plains up to some 4,000 feet. It is said to keep principally to the higher trees for feeding, but occasionally descends to the ground and often to lower trees which are in fruit. Its diet consists of fruit, small reptiles, insects, etc., and Legge syllabifies its call as "Ka-ka-ka," uttered slowly and then quickening to "Kakaka," quickly repeated. Like other Hornbills it is a noisy bird and frequently utters its discordant notes. It collects in small flocks of five to a dozen individuals. The natives consider it a good bird to eat and doubtless it is much like the larger Hornbills in this respect, which are all quite palatable and not to be despised.

Genus **RHINOPLAX**.

Rhinoplax Gloger, Hand- u. Hilfsb., p. 335 (1842).

Type, *Buceros vigil* Forst.

In this genus the bill is moderate and pointed with the commissure almost straight; the casque is high, flat on the sides, with a curious corrugated line about halfway between the culmen and the top of the casque; top rounded and front sloping backwards from the culmen; the whole chin, throat, neck and centre and upper back naked; central tail-feathers twice as long as lateral. Sexes alike.

(1578) **Rhinoplax vigil.**

THE HELMETED HORNBILL.

Buceros vigil Forst., Ind. Zool., p. 40 (1781) (Tenasserim).
Rhinoplax vigil. Blanf. & Oates, iii, p. 158.

Vernacular names. None recorded.

Description.—Male. Feathers round the back of the eye and ear-coverts rufous; forehead, crown and nape black; breast, sides of the back and exposed wings brownish-black; the scapulars, innermost secondaries and rump brown; base and tips of all but first primary and all secondaries white; central tail-feathers pale brown with still paler tips and the lateral tail-feathers white, all with a broad subterminal black band; upper and lower tail-coverts, under wing-coverts and abdomen white.

Colours of soft parts. Iris dark red; anterior half of bill and front of casque yellow; rest of casque and posterior half of bill crimson; bare skin of neck and back, legs and feet and skin everywhere beneath the feathers dull deep red in male. In the female the naked back and hind-neck are reddish-lilac; sides and front of neck greenish-blue, veined with sky-blue. (*Hartert.*)

Measurements. Wing 455 to 480 mm.; tail 850 to 960 mm.; tarsus 76 to 79 mm.; culmen 200 to 207 mm.; greatest length of casque 102 mm.; height 54 mm.; width 57 mm.

Female similar to male but smaller.

Young birds are like the adult but have no casque at first and as this grows it increases in size posteriorly first and finishes at its maximum height in front. The corrugated line appears last and is a sign of age.

Distribution. Tenasserim, South through the Malay Peninsula to Sumatra and Borneo.

Nidification. Unknown.

Habits. According to Davison and Hartert this Hornbill is the most shy and hardest to procure of all the Hornbills. It is entirely a forest bird, keeping to high trees and never descending to the ground. Its call is described as beginning with a "whoop-whoop-whoop" uttered at long intervals and then gradually becoming faster until it ends in a "harsh quacking laugh." The solid casque of this Hornbill is in great request as a love-charm and, after being elaborately carved, fetches as much as fifty rupees. So far as is known they feed only on fruit.

Family UPUPIDÆ.

This Family, which contains the Hoopoes, is very close to the Hornbills, the skeletons and internal anatomy differing but little. The sternum has the posterior notches deep instead of shallow and the manubrium is flat and broad; only the left carotid is present.

The deep plantar tendons are free from each other as far as the division of the *flexor perforans digitorum*, but a vinculum from the *flexor longus hallucis* leads to that slip from the other tendon which supplies the third digit, or middle toe, the union with the vinculum taking place below, not above the root of the toe. The foot is imperfectly syndactyle, digits three and four being joined at the base.

Genus **UPUPA.**

Upupa Linn., Syst. Nat., 10th ed., i, p. 117 (1758).

Type, *Upupa epops* Linn.

The characters of the genus, the only one of the family represented in India, are practically those of the family itself. The bill is very long, slender, and curved from the base; the tongue is very short; the tarsus is short and scutellate behind; the wing is rounded and has 10 primaries; the tail moderate in length with 10 rectrices only; there is a long, ample erectile crest, the posterior feathers the longest. The sexes are alike.

Upupa epops.

Key to Subspecies.

A. Hinder feathers of crest with white subterminal spots; general colour paler, less rufous.
  a. Paler and slightly smaller ..... *U. e. epops*, p. 308.
  b. Darker and slightly larger ..... *U. e. saturata*, p. 310.
B. Hinder feathers of crest normally with no white spots; general colour darker, more rufous.
  c. Palest and with wing average about 135 mm.; culmen average about 46 mm. *U. e. orientalis*, p. 311.
  d. Intermediate in colour; wing average about 140 mm.; culmen average about 54 mm. ..... *U. e. longirostris*, p. 312.
  e. Darkest and most rufous; wing average about 130 mm.; culmen average about 48 mm. ..... *U. e. ceylonensis*, p. 312.

The division of *U. epops* into geographical races is very difficult as it is a bird which wanders to great distances during migration, so that in Winter many races may be obtained in one locality. On the other hand, individual pairs seem to occasionally leave their normal breeding haunts and to visit elevations greatly higher than might be expected. An instance of this is the breeding of typical specimens of *U. e. orientalis* as high as Sukna in Darjeeling, some 7,000 feet elevation.

(1579) Upupa epops epops.

THE EUROPEAN HOOPOE.

Upupa epops Linn., Syst. Nat., 10th ed., i, p. 117 (1758) (Sweden); Blanf. & Oates, iii, p. 159 (part).

Vernacular names. *Hudhud* (Pers. and Hind.); *Suk-dudu* (Chamba); *Katkuto* (Sind).

Fig. 52.—Head of *U. e. epops*. $\frac{2}{3}$.

Description. Crest pale rufous, each feather tipped with black and the longest posterior feathers sub-tipped white; sides and back of head and neck rather paler rufous with a pinkish tinge; upper back, scapulars and edge of wing light, rather rufous, brown; a black bar runs from the shoulder of the wing right across the back and this is followed by a broad buffy-white band; two similar bands follow, the buff one obsolete on the back; greater coverts black tipped with white; primaries black with a white band near the tip and not showing on the outer web of the first primary; outer secondaries black with four bold bars of white; innermost secondaries black and buff in oblique bands; rump white; upper tail-coverts black; tail glossy blue-black with a bold white bar across the centre, running up almost to the tip of the tail on the outer web of the outermost pair; chin, throat and breast vinous

or pinkish-rufous; abdomen and flanks white broadly streaked with black on the outer webs; under tail-coverts white.

Colours of soft parts. Iris brown to red-brown; bill plumbeous pink at the base, deepening to black from the middle to the tip; legs and feet plumbeous.

Measurements. Wing, Europe, 138 to 152 mm.; India, 124 to 154 mm.; tail 89 to 110 mm.; culmen 41 to 55 mm.; tarsus about 20 mm.

Young birds are like the adults but duller and paler above and browner below.

Distribution. Breeds throughout Europe and Western Asia as far East as the Yenesei and South to the Himalayas from Afghanistan and Baluchistan to Western Nepal. Specimens from the higher ranges of E. Nepal and Sikkim are perhaps referable to the Eastern form *saturata* but are generally intermediate; those from the lower ranges are typical *U. e. orientalis*. In Winter it is common in Sind, Punjab and United Provinces, and it occurs South as far as Khandesh, Belgaum, Seoni and the Deccan and as far East as Bihar and Chota Nagpore. Many Winter birds with abraded plumage are hard to distinguish and possibly some of the smallest birds included in the measurements given above are really *U. e. orientalis*.

Nidification. The European Hoopoe breeds in great numbers in Kashmir, Garhwal, Simla, etc. between 5,000 and 10,000 feet, perhaps higher still. The birds commence laying in early April and continue until the end of May or early June, depositing five to eight eggs in nests in holes in walls, trees, houses, or even earthen banks and cliffs. In some cases the nest is a comparatively bulky affair of sticks, leaves, roots, grass and all kinds of rubbish, generally lined with wool or hair. When the nest is of this description the smell is often very strong and disagreeable, but at other times the eggs are laid on a little grass, a few leaves or even on the bare ground and then there is much less smell. The eggs when first laid are white with a creamy, grey or lavender tint, but the texture is very porous and they become very stained in a short time, after which they become grey, olive, sandy-brown or, exceptionally, deep olive-grey. Occasionally the eggs when fresh are a bright pale grey-blue. One hundred Indian-taken eggs average 26·1 × 17·5 mm.; maxima **28·6** × 18·1 and 25·3 × **18·5** mm.; minima **23·1** × 17·2 and 26·0 × **16·3** mm.

Habits. This Hoopoe in Indian limits is a bird of elevations of 5,000 feet upwards in Summer, probably being found practically up to the snow-line. It is difficult to say where this form and *U. e. orientalis* meet. On the outskirts of the Himalayas, where the temperature is not affected by adjacent snows, the latter bird is certainly found up to about 7,000 feet and it penetrates a considerable distance into the Valleys of the Himalayas. On the other hand, I have seen specimens from Garhwal breeding at

10,000 feet which were typical *U. e. epops*. It is a bird of open country, cultivated or waste, feeding entirely on the ground, but perching on low branches, posts, etc. when resting. They are very active, cheerful and lively birds, sometimes stalking slowly along and probing here and there with their long bills for food; at other times making constant little runs in between each capture. They eat worms of all kinds, ants, eggs, pupæ, larvæ, termites, etc. I have seen them running over dead fallen trees and searching the rotting wood for beetles and their larvæ. The flight is normally rather slow and dipping but they can fly at a great pace when needed. Their cry is a deep "hoop, hoop, hoop," uttered at well-marked intervals but running quicker together when the bird is excited. The crest at such times is erected, or jerked up and down, but normally it is held depressed and folded back.

This form is truly migratory, leaving its Summer habitat in September and October and returning in March and April. During Winter it spreads over a great area and at this time becomes mixed up with *U. e. orientalis* and *U. e. ceylonensis* in the most extraordinary way.

(1580) Upupa epops saturata.

THE TIBETAN HOOPOE.

Upupa epops saturata Lönnberg, Arkiv for Zool., v, p. 29 (1909) (Kiachta).
Upupa epops. Blanf. & Oates, iii, p. 159 (part).

Vernacular names. *Dao-hu-dup* (Cachari).

Description. Very similar to typical *U. e. epops* but a trifle darker on the back and wings and distinctly darker and more brown, less vinous on the breast.

Colours of soft parts as in *U. e. epops*.

Measurements. Wing 123 to 164 mm.; culmen 39 to 55 mm. Few birds are under 140 mm. in wing-measurement.

Distribution. Breeding from about the Yenesei to Mongolia and Manchuria; South to the higher ranges of Sikkim—above 8,000 feet—Tibet and, probably, throughout the higher ranges of Central China. In Winter it migrates South to South China, the Indo-Chinese countries, Burma, Assam and India. Ticehurst identifies specimens from Seoni, Belgaum and the Deccan as being of this race but it is probably rare anywhere West of Bengal and Orissa.

Nidification. The Tibetan Hoopoe breeds from April to June practically throughout the open Tibetan and Siberian country, in the former up to 14,000 feet and possibly 2,000 feet higher. The nest, which is generally a bulky one but even in these high altitudes sometimes scanty or absent, is nearly always made in the walls or under the eaves of Tibetan stone houses, sometimes in holes in boundary walls, less often in holes of willows or other

trees. The eggs, four to eight in number, are like those of the preceding bird but larger. Sixty eggs average 26·3 × 18·3 mm.: maxima 29·1 × 21·0 mm.; minima 24·2 × 17·3 and 25·0 × 16·0 mm.

Habits. Those of the species. Apparently resident in Tibet up to 12,000 ft. throughout the year, but a good many individuals penetrate to the plains in Winter.

(1581) Upupa epops orientalis.

THE INDIAN HOOPOE.

Upupa epops orientalis Stuart Baker, Bull. B. O. C., xlii, p. 29 (1923) (Amballa).
Upupa indica. Blanf. & Oates, iii, p. 161.

Vernacular names. *Hudhud* (Hind.); *Sutar* (Mahr.); *Kondeh-Pitta, Kukudeu guwa* (Tel.).

Description. Differs from the two preceding races in having no white spots on the crest-feathers, though traces of this may be seen in some of the most Northern breeding birds. The rufous of the head, neck, crest and breast is much darker and richer and is a purer rufous with less brown or vinous tint; on the back also the rufous is more extensive.

Colours of soft parts as in the other races.

Measurements. Wing 128 to 160 mm.; culmen 42 to 60 mm. Practically all sexed males have a wing of over 150 mm.

Distribution. The whole of Northern India, including the sub-Himalayas, from the Punjab to Bihar and Bengal. It ascends the Himalayas to at least 7,000 feet in Sikkim, as there are typical specimens in the British Museum received from Sukna and Darjeeling. Its Southern limits are quite impossible to define, as it grades slowly into the smaller more richly-coloured Ceylon form, *ceylonensis*. Roughly it may be said to extend to the Bombay Presidency to about the latitude of Khandesh on the West, to the Northern Deccan in the centre, and on the East still farther South to the Madras Presidency.

Nidification. March and April is the laying season for this Hoopoe in the plains, many birds commencing in February but in the sub-Himalayas they breed up to the end of May. They lay four to eight eggs, generally five or six, in holes in mud banks and walls, houses, old forts, trees, etc. Marshall also found it breeding in "nooks and crannies formed by twisted suckers of the Banian-tree." As a rule in the hot plains there is a nest made of, at the most, just a little hair, wool or a few leaves or scraps of rubbish. The eggs are like those of the other species but one hundred average 24·6 × 16·9 mm.; this average, however, would be increased if the eggs of Ferozepore were eliminated, as the birds of this district are very small and really seem to be a local colony of the Southern Indian and

Ceylon form. Maxima **26·0 × 19·0** mm.; minima **21·5 × 15·4** and **22·8 × 15·3** mm.

Habits. Those of the species.

(1582) Upupa epops ceylonensis.

THE CEYLON HOOPOE.

Upupa ceylonensis Reichb., Handb., Scans., p. 320 (1853) (Ceylon).
Upupa indica. Blanf. & Oates, iii, p. 161 (part).

Vernacular names. *Kukudeu guwa* (Tel.); *Chaval kuruvi* (Tam., in Ceylon).

Description. This is the darkest and smallest of all the forms of Hoopoe; the breast has seldom any tint of vinous and the rufous of the head and crest is deep and rich.

Colours of soft parts as in the other races.

Measurements. Wing 117 to 140 mm.; but of over thirty specimens measured only three have wings of over 135 mm.; culmen 39 to 54 mm. (one, only, 72 mm.).

Distribution. Ceylon and South India, South of the range of the last race. It is common in Travancore and thence up the West coast and to the Nilgiris, Palni Hills and other Western ranges, where all the breeding birds are quite definitely of this form. Thence it extends to the Deccan and to the Bombay Presidency, where it merges into the previous race.

Nidification. Quite similar to that of the Northern bird. The breeding-season is February to April and the eggs number four to six. In Ceylon the birds apparently breed from November to April and as Layard shot young birds in August they possibly have a second brood.

Forty eggs average 24·3 × 16·3 mm.: maxima **26·0 × 16·4** and **24·5 × 17·3** mm.; minima **21·7 × 15·5** mm.

Habits. Those of the species. This subspecies cannot be called migratory but it certainly is found outside its normal breeding area in the cold weather and possibly at this time wanders considerably.

(1583) Upupa epops longirostris.

THE BURMESE HOOPOE.

Upupa longirostris Jerdon, B. of I., i, p. 393 (1862) (Burma, restricted to Rangoon).
Upupa indica. Blanf. & Oates, iii, p. 161 (part).

Vernacular names. *Toun-bee-sote* (Burma).

Description. Intermediate in colour between *U. e. orientalis* and *U. e. ceylonensis* but larger than either and with a proportionately still longer bill on an average.

Colours of soft parts as in the other races.

Measurements. Wing 136 to 158 mm., a few small females from Siam run from 125 to 135 mm.; culmen 42 to 66 mm.; the great majority well over 50 mm.

Distribution. Assam, Burma, Siam and the Indo-Chinese countries to Hainan.

Nidification. In Assam I found this bird breeding in April and May. Hopwood took eggs in the same months in Upper Burma, whilst Oates took them during March and April in Pegu and Darling as early as February in the Malay Peninsula. The favourite site in Assam was in among the huge stacks of firewood which are collected in tea-gardens for fuel. In these the nests were very large and very evil-smelling. Elsewhere the usual holes in trees, wall or even banks are made use of and there is little, if any, nest. The birds sit very close and will almost allow themselves to be handled before they leave hard-set eggs or young. The female sits all day, being most assiduously fed by the male, but she generally has an hour off at dawn and before sunset, when the cock bird takes her place. The young birds when hatched smell very strongly and any nest-hole which has been occupied for two or three days has this smell to some extent. The male displaying is a very pretty sight. He advances towards the female with little mincing steps, his crest rapidly erected and depressed as he constantly bows and nods, his wings drooped and shivering and tail held low and slightly spread. Whilst advancing he utters a very soft, low "hoop, hoop," hardly audible at a dozen paces distant.

Habits. Those of the species. It is a most familiar, tame bird and particularly fond of lawns in gardens. I have noticed this race eating grasshoppers.

Suborder **TROGONES.**

The precise affinities of the Trogons are difficult to determine but all the evidence derived from their anatomy seems to show that they must be regarded as having split off from the very base of the stem which gave rise, eventually, to the *Caprimulgi*, *Cypseli*, *Colii*, and *Striges*. The fact that they have ranged from the Old into the New World shows them to be a very ancient group. Furthermore, it is significant that remains of a fossil Trogon have been found in the upper Eocene of Southern France.

The Trogons differ from all other birds in the structure of the feet. The first and second digits are turned backwards and are supplied by the *flexor longus hallucis*, whilst the third and fourth digits are directed forwards and connected with the *flexor perforans digitorum*. The two flexor tendons are united by a vinculum.

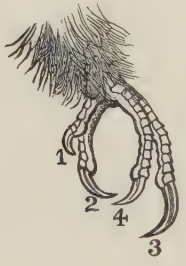

Fig. 53.—Right foot of *P. e. erythrocephalus*. $\frac{1}{1}$.

Fig. 54.—Deep plantar tendons of *Trogon puella* (Garrod, P. Z. S., 1875, p. 345).

Palate schizognathous; basipterygoid processes present; sternum with four notches on the posterior border; manubrium long and slightly forked; coracoids in contact; oil-gland nude; cæca present but short; spinal feather-tract well defined from nape to oil-gland but not forked; after-shaft of contour-feather large; wing without median coverts; tail-feathers twelve; ambiens muscle wanting. Sexes dissimilar and young like the female.

There is only one family.

Family TROGONIDÆ.

In this family the bill is short, strong and wide, the tip of the culmen boldly hooked and toothed; nostrils and base of the bill well covered with bristles; feet small and tarsi feeble; tail-feathers twelve, primaries ten; plumage soft and dense and the skin very thin.

The family is distributed throughout the Oriental and Æthiopian regions and Tropical America. Only one genus is represented in India; this is widely distributed throughout the Oriental Region.

Genus **PYROTROGON.**

Pyrotrogon Bonaparte, Consp. Vog. Zyg., p. 14 (1854).

Type, *Trogon ardens* Temm. Philippines.

Tail long, the feathers broad and squarely truncated in adults but pointed in the young; the outer three pairs of feathers strongly graduated; wing rounded, the inner primaries and secondaries very short; tarsus half feathered; cheeks partly naked.

Key to Species.

A. Head and neck dark grey or black; abdomen crimson.
  a. A white band across breast ..... *P. fasciatus*, ♂, p. 316.
  b. No white band ..... *P. duvauceli*, ♂, p. 319.
B. Head red; abdomen crimson ..... *P. erythrocephalus*, ♂, p. 318.
C. Head yellowish-olive; abdomen orange ..... *P. oreskios*, ♂, p. 321.
D. Head brown or brownish-olive.
  c. Abdomen brownish-buff ..... *P. fasciatus*, ♀, p. 316.
  d. Abdomen red or pink.
    a'. Crown and back concolorous; wing over 125 mm. ..... *P. erythrocephalus*, ♀, p. 318.
    b'. Crown darker than back; wing under 125 mm. ..... *P. duvauceli*, ♀, p. 320.
  e. Abdomen yellow..... *P. oreskios*, ♀, p. 321.

Pyrotrogon fasciatus.

Key to Subspecies.

A. Head and fore-neck grey, not black or blackish ..... *P. f. fasciatus*, p. 316.
B. Head and neck black, not grey ..... *P. f. malabaricus*, p. 317.

(1584) Pyrotrogon fasciatus fasciatus.

THE CEYLON TROGON.

Trogon fasciatus Pennant, Ind. Zool., pl. iv (1769) (Ceylon).
Harpactes fasciatus. Blanf. & Oates, iii, p. 199 (part).

Vernacular names. *Nawa nila kurulla, Ranwan kondea, Ginni kurulla* (Cing.).

Description.—Male. Head, neck and extreme upper breast grey, darkest on the crown; back, rump, upper tail-coverts, scapulars and wing-coverts on the shoulder yellowish-brown, paler and brightest on the upper tail-coverts and rump; central tail-feathers chestnut, tipped black; the next two pairs all black except for a little chestnut near the basal shafts; outer pairs black, the terminal halves diagonally white; wing-coverts and innermost secondaries blackish with fine wavy bars of white; greater primary coverts less barred, or all black; primaries black with whitish edges; a white pectoral collar below the grey upper breast; remainder of lower plumage crimson, a little paler on the abdomen, vent and under tail-coverts.

Colours of soft parts. Iris dark brown; orbital skin smalt-blue; bill deep blue, the tip and culmen darker; legs and feet lavender-blue.

Measurements. Wing 118 to 123 mm.; tail 139 to 149 mm.; tarsus about 13 to 14 mm.; culmen about 16 to 17 mm.

Female. Head and neck olive-brown; tail like that of the male but with more chestnut on the third and fourth pairs of feathers; the bars on the wings are rufous instead of buff; lower plumage from the breast orange-brown or buff-brown with no white pectoral band.

Nestlings like the female but with no black tips to the tail-feathers.

Young males gradually assume the plumage of the adult, the grey head first appears and then crimson feathers in the orange-brown underparts; the central tail-feathers are wholly black and the next two pairs have much chestnut on the outer webs.

Distribution. Ceylon only.

Nidification. Unknown.

Habits. Apparently quite similar to those of the next and better-known form. According to Wait it occurs in high forest all over the island of Ceylon.

(1585) Pyrotrogon fasciatus malabaricus.

THE MALABAR TROGON.

Trogon malabaricus Gould, P. Z. S., 1834, p. 26 (Malabar coast).
Harpactes fasciatus. Blanf. & Oates, iii, p. 199 (part).

Vernacular names. *Kufni churi* (Hind.); *Karna* (Mahr.); *Kakarne hakki* (Can.).

Description. Differs from the typical Ceylon form in having a much darker head, neck and upper breast, these parts being black or nearly so with merely a brown tinge.

The females do not appear to be quite so bright a colour above.

Colours of soft parts as in the Ceylon Trogon.

Measurements. Wing 125 to 134 mm.; tail 154 to 170 mm.; tarsus about 13 to 14 mm.; culmen about 16 to 17 mm.

Distribution. Travancore, the Malabar and South Bombay Presidency coasts East to the hill ranges of Mysore etc. It has also been recorded from Chota Nagpore and Midnapore in Western Bengal and thence South to the mouths of the Godavery.

Nidification. The Malabar Trogon breeds commonly in Travancore and less commonly in the more Northern parts of its distribution. The eggs, which number two to four, are deposited in natural hollows in dead trees or stumps at any height from the ground but, as a rule, under twenty feet. No nest is made and no lining other than the rotten wood or, maybe, a few wind-blown scraps of leaves etc. The hollow selected is often a large one with a large entrance and occasionally eggs may be found in very exposed hollows. Both sexes assist in incubation. The eggs are a pale buff or *café-au-lait*, some so pale as to appear white unless placed alongside some really white object. Thirty eggs, mostly taken by Stewart, average $26{\cdot}7 \times 23{\cdot}4$ mm.: maxima $\mathbf{28{\cdot}0} \times 24{\cdot}0$ and $27{\cdot}4 \times \mathbf{25{\cdot}0}$ mm.; minima $\mathbf{24{\cdot}2} \times 22{\cdot}7$ and $26{\cdot}2 \times \mathbf{22{\cdot}2}$ mm. In shape they are very spherical and the texture is hard and close with a fine gloss.

Habits. Ferguson describes this Trogon as a shy, retiring bird, keeping to thick jungle but whose presence is often betrayed by its *mewing* call. It is found from 1,000 feet upwards and sometimes, though but rarely, in the plains' forests. It feeds much on coleoptera, cicadæ and other hard morsels, capturing them for the most part on the wing, scrunching them with its powerful bill and swallowing them, hardest and softest portions together.

(1586) Pyrotrogon erythrocephalus erythrocephalus.

THE RED-HEADED TROGON.

Trogon erythrocephalus Gould, P. Z. S., 1834, p. 25 (Rangoon).
Harpactes erythrocephalus. Blanf. & Oates, iii, p. 200.

Vernacular names. *Suda-sohagin* ♂, *Cuchcuchia* ♀ (Beng.); *Hamesha piyara* (Hind.); *Sakvor* (Lepcha); *Htat-ta-yu* (Burmese).

Description.—Male. Head, neck and extreme upper breast deep crimson, a tuft of bristly feathers on the chin and the shafts of others on the throat black; back, scapulars, rump and upper tail-coverts ferruginous-brown, brighter and more ferruginous on the rump and coverts; central tail-feathers chestnut tipped black; the two next pairs black, the shaft near the base and sometimes

Fig. 55.—Head of *P. e. erythrocephalus.* ½.

the edges chestnut and sometimes the whole outer web of this colour; outer pairs black with broad white tips; wing-coverts and innermost secondaries vermiculated black and white, the former tinged with rufous on the shoulder; primary coverts black; primaries black edged with white on the outer webs; a white pectoral band below the crimson throat, often obsolete and sometimes absent; remainder of lower parts bright crimson, palest on the abdomen.

Colours of soft parts. Iris dull red to crimson-red; orbital skin purplish-blue; bill lavender-blue, the tips of both mandibles and culmen blackish; legs and feet fleshy-pink.

Measurements. Wing 130 to 149 mm.; tail 170 to 200 mm.; tarsus 13 to 14 mm.; culmen about 16 to 17 mm.

Female. Head, neck and upper breast dull orange-brown; the coverts orange-brown and black instead of white and black; remainder of plumage as in the male but generally with more chestnut on the lateral tail-feathers.

Young birds have the wing-coverts black, broadly edged with

buff and the inner secondaries black barred with buff on the outer webs and tipped with the same; the whole of the under plumage from the throat buff or buffy-white.

Distribution. The Himalayas from Nepal to Eastern Assam, North and South of the Brahmaputra, Manipur, Chittagong and Tippera Hills, the whole of Burma to Tenasserim.

Nidification. Oates and Bingham took eggs of this species in Southern Burma in May and March respectively, whilst Hodgson and Gammie record their breeding in Nepal and Sikkim from April to July. In Assam we found them breeding abundantly between the foot-hills and 3,000 feet from April to August. Occasionally they breed as high as 4,000 feet. and, very rarely, even higher than this. The eggs, two to four in number, are placed in hollows in trees or dead stumps. Some holes are excavated by the birds themselves but the great majority are large, natural hollows between five and twelve feet from the ground. The sites selected are nearly always in deep forest but often alongside a foot-track or small stream. Both birds assist in incubation and sometimes both occupy the nest-hole at the same time. The eggs are blunt, broad ovals, often very spherical and in colour are a pale buff or *café-au-lait*, never white or nearly white. Eighty eggs average 28·6 × 24·0 mm.: maxima **33·2** × 23·2 and 29·5 × **25·7** mm.; minima **26·1** × 24·5 and 29·0 × **22·0** mm. During the breeding-season the male and female fly circling round one another, uttering constantly a little plaintive scream, very high-pitched and unlike any other bird-note known to me.

Habits. The Red-headed Trogon is most common in the lower hills between 1,500 and 2,500 feet but it spreads some distance into the forests at the foot of the hills and I have seen it near Shillong at about 5,000 feet. It is exclusively a forest bird and prefers the interior of damp, dark evergreen cover, where it sits very silent and quiet throughout the heat of the day. It perches normally in a very upright position but rarely on a large bough crouches lengthways like a Nightjar or Frogmouth. Its ordinary call is a low "mew," which is but rarely uttered. It feeds principally on the wing but is said also to feed on the ground and I have seen it catching cicadæ on the bark of trees, to which it clings. It feeds on all sorts of insects, coleoptera, cicadæ, centipedes, wood-lice, etc. and in the early mornings and evenings hawks moths very assiduously and successfully.

(1587) **Pyrotrogon duvauceli.**

THE RED-RUMPED TROGON.

Trogon duvauceli Temm., Pl. Col., pl. 291 (1824) (Sumatra).
Harpactes duvauceli. Blanf. & Oates, iii, p. 201.

Vernacular names. *Htat-ta-yu* (Burmese).

Description.—Male. Whole head and neck black; back, scapulars and innermost wing-coverts orange-brown; rump, upper tail-coverts and lower plumage from throat crimson; central tail-feathers chestnut tipped with black, the next two pairs black and the three outer pairs black at the base and diagonally white on the terminal halves; wing-coverts and innermost secondaries vermiculated black and white but in more definite bars than in *P. e. erythrocephalus*; primaries black, stippled with whitish on the outer webs; outer secondaries black.

Colours of soft parts. Irides brown to reddish-brown; orbital region smalt-blue; bill cobalt-blue, the tip and top of culmen and a narrow streak on either side blackish; gape cobalt-blue; legs and feet lavender-blue to deep smalt-blue.

Measurements. Wing 103 to 113 mm.; tail 121 to 133 mm.; tarsus about 12 mm.; culmen about 14 to 15 mm.

Female. Upper parts of head dark brown; back and scapulars duller than in the male; the rump and upper tail-coverts brighter and the latter tinged with crimson; tail and wings as in the male, but the latter barred pale rufous instead of white; chin and throat dull rufous; breast paler, brighter rufous, changing to pale crimson on the abdomen, flanks and under tail-coverts.

Young birds are like the female but have the wing-coverts more broadly barred with pale rufous and the underparts wholly dull rufous, albescent on the abdomen and white on the under tail-coverts.

Distribution. Southern Tenasserim and South-West Siam to Sumatra and Borneo.

Nidification. As far as is known, similar to those of the other species of this family but the eggs are practically pure white and, of course, very small. Eggs taken by Moulton and Kellow vary in size between $25{\cdot}0 \times 20{\cdot}2$ and $23{\cdot}0 \times 19{\cdot}3$ mm.

Habits. Those of the genus. Davison says that its call-note is a soft "too-too-too," repeated quickly and that when suddenly alarmed, it utters a note as it takes to flight sounding like "kir-r-r-r."

Pyrotrogon oreskios.

Trogon oreskios Temm., Pl. Col., pl. 181 (1823).

Type-locality: Java.

The typical form differs from that found in the Malay Peninsula and Burma in having the upper tail-coverts tinged with orange and not uniform in colour with the back.

(1588) Pyrotrogon oreskios uniformis.

ROBINSON'S YELLOW-BREASTED TROGON.

Pyrotrogon oreskios uniformis Robinson, Journ. Fed. Malay States Mus., vii, p. 149 (1917) (Trang, Malay Pen.).
Harpactes orescius. Blanf. & Oates, iii, p. 202.

Vernacular names. None recorded.

Description.—Male. Head and neck olive-green, passing into yellowish-olive on the hind-neck, chin, throat and fore-neck; back, scapulars, rump, upper tail-coverts and central tail-feathers chestnut, the latter tipped with black; three outer pairs black on the basal, white on the terminal halves; wing-coverts and inner secondaries black, narrowly barred with white; greater coverts black; primaries and outer secondaries black with white edges to the outer webs; lower plumage orange-yellow, the breast a deeper reddish-orange.

Colours of soft parts. Iris dark brown; orbital skin bright smalt-blue; bill purplish-blue, the culmen and tip almost black; legs and feet plumbeous blue.

Measurements. Wing 122 to 130 mm.; tail 164 to 185 mm.; tarsus about 13 to 14 mm.; culmen 14 to 15 mm.

Female. Above dull rufous olive-brown, the upper tail-coverts brighter and more rufous; tail as in the male; wings as in the male but the white bars replaced by rufous; chin, throat and fore-neck greyish-olive; remainder of underparts yellow, deepest and tinged with orange on the breast.

Nestlings are rufous above with dark rufous-brown head; chin and upper throat dark brown, lower plumage pale dark rufous; wings as in the adult but coverts and inner secondaries broadly barred rufous and black.

Distribution. Tenasserim and the Malay Peninsula.

Nidification. Davison, Bingham and Hopwood obtained the eggs of these birds in February and March from holes in very soft, rotten trees which apparently are almost always hollowed out by the birds themselves. The eggs are of the usual pale *café-au-lait* and eleven average 26·3 × 21·3 mm.: maxima **27·4** × 21·3 and 27·1 × **22·0** mm.; minima **25·2** × 21·3 and 25·4 × **20·7** mm. The normal clutch seems to be two or three but Hopwood took one, much incubated, consisting of four eggs.

Habits. This little Trogon is found up to about 4,000 feet and resembles other Trogons in its habits but keeps less exclusively to dense forest. According to Davison it is sometimes found even in isolated clumps of trees and in thin deciduous forest whilst it also seems to feed far more frequently on the ground than do most Trogons. They are very tame birds and do not resent being watched.

Suborder CYPSELI.

The *Cypseli* are generally now considered to form one Suborder of two families, the *Micropidæ*, or Swifts, and the *Trochilidæ*, or Humming-Birds. The latter, however, do not occur in the Oriental Region and it is therefore not necessary to discuss their position. On the other hand, many systematists consider that the Swifts are so closely allied to the *Caprimulgi*, Nightjars, and *Podargi*, Frogmouths, that they all should be retained in one group. Admittedly, there are many connecting-links in these three Suborders but they are separated by certain well-defined characters, so that though we may accept the contention that they come from one common stock, it seems preferable, on the whole, to treat them as separate Suborders.

Pycraft has dealt with this group and with the Colies in great detail and those who wish to go further into the question should consult his writings *.

The Swifts are distinguished by having the shortest humerus and longest manus of all known birds, a curious contrast with those of the Albatross, equally famous for its power of flight, but which has relatively an excessively long arm and conspicuously short hand.

The foot of the Swift is remarkable and is of the form termed *pamprodactylous*, i. e. all the toes are turned forwards. The skeleton of the foot is also remarkable, inasmuch as the formula for the phalanges for the true Swift runs 2. 3. 3. 3, whilst in the *Caprimulgi* it runs 2. 3. 4. 4, suggesting that the process of reduction started in this group. The actual working position of the foot in the various genera of Swifts varies greatly and, it may be, that further anatomical research into this particular question may reveal much interesting information.

The arrangement of the deep plantar tendons † vary in the different genera; thus in *Micropus* the *flexor longus hallucis* supplies digits 2 and 4 and the *F. p. digitorum* digits 1 and 3; in *Hemiprocne* the *F. l. hallucis* runs directly downwards to fuse with *F. p. digitorum* and sends, above the branching of this tendon, a narrow tendon to digit 1.

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* Pycraft, W. P., "On the Anatomy and Systematic Position of the Colies," Ibis, 1907, p. 250.

Ibid., "Some facts concerning Aquintocubitalism," Journ. Linn. Soc. xxvii (1899).

† Pycraft, Ibis, 1907, p. 250.

Family MICROPIDÆ.

The skull is ægithognathous and lacks basipterygoid processes; the sternum has a very deep keel and a continuous posterior border; the pterylosis is like that of the Colies, having a broad *apterion* across the *pteryla capitis*, horseshoe-shaped in the Swifts, V-shaped in the Colies; the semitendinosus is absent; there are no cæca; there is a large after-shaft; the young have down on the *apteria* until the feathers appear.

Key to Subfamilies.

A. Tarsus feathered; three anterior toes each with 3 phalanges ..... *Micropinæ*, p. 323.
B. Tarsus naked, or nearly so; second toe with 3, third toe with 4 and fifth toe with 5 phalanges.
  a. Tarsus equal to middle toe or longer; closed wings extending far beyond tail..... *Chæturinæ*, p. 339.
  b. Tarsus shorter than middle toe; closed wings not extending beyond tail .... *Hemiprocninæ*, p. 353.

Subfamily MICROPINÆ.

This includes the Common Swifts, which are typical, the hind toe being completely reversible, whilst the third and fourth toes have only three phalanges. Sexes alike.

This subfamily is practically cosmopolitan.

Key to Genera.

A. Toes directed forwards in one line..... Micropus, p. 323.
B. Toes directed forwards but in two distinct pairs, the inner and hind toes directed inwards, the other toes outwards..... Tachornis, p. 336.

Genus **MICROPUS.**

Micropus Meyer & Wolf, Taschenb., i, p. 280 (1810).

Type, *Hirundo apus* Linn.

The true Swifts have all four toes directed forward, though the first or hinder toe is reversible; the tarsus is feathered in front, short and adapted for clinging purposes only; the wings are long, very powerful and pointed. Sexes alike.

Key to Species.

A. No white on rump.
- *a.* Abdomen white ..... *M. melba*, p. 324.
- *b.* Abdomen brown:
  - *a'.* General colour blackish-brown ..... *M. apus*, p. 325.
  - *b'.* General colour greyish-brown ..... *M. murinus*, p. 327.
- *c.* Abdomen black, the feathers edged with white ..... *M. acuticaudus*, [p. 327.

B. A white band across the rump.
- *d.* Tail deeply forked ..... *M. pacificus*, p. 329.
- *e.* Tail even or nearly so ..... *M. affinis*, p. 332.

Fig. 56.—Left foot of *M. a. pekinensis*. ½.

(1589) Micropus melba melba.

THE ALPINE SWIFT.

Hirundo melba Linn., Syst. Nat., 10th ed., i, p. 192 (1758) (Gibraltar).
Cypselus melba. Blanf. & Oates, iii, p. 164.

Vernacular names. *Burra Ababil* (Hind.).

Description. Whole upper plumage, a band across the breast and the under tail-coverts brown, varying slightly in depth; each feather faintly darker at the sub-tip and, when in very fresh plumage, tipped paler; under wing-coverts, axillaries and edge of wing brown with more conspicuous white tippings; remainder of plumage white.

Colours of soft parts. Iris dark brown; bill black; legs and feet blackish-purple.

Measurements. Wing 205 to 220 mm.; tail 72 to 81 mm.; tarsus about 15 to 16 mm.; culmen 9 to 10 mm.; tail deeply forked, the outer feathers exceeding the inner by about 18 mm.

Young birds have more definite white edgings to the feathers of the brown parts, especially on the wings, breast-band and under tail-coverts.

Distribution. The mountains of Northern Africa and of Southern Europe as far North as the Alps; South-West Asia to practically the whole of India and Ceylon. It is found as far East as Assam and is common during the Winter in Cachar and Sylhet.

It is noticeable that in the few specimens of, presumably, breeding birds from South India the dimensions are very small, the wing never exceeding 200 mm. and generally measuring between 190 and 195 mm. If sufficient material of *certainly* breeding birds could be obtained, it would probably show that the Southern Indian resident bird is always smaller and a little darker.

Nidification. This fine Swift breeds during June and perhaps the last week of May, making a nest of feathers and wind-carried scraps agglutinated together with saliva. The walls are stout and thick and there is generally a lining of feathers, sometimes of very large and stiff ones mixed with softer. The nest may be placed either in a crevice of rock or a cave, or in church towers or other old and suitable buildings. The eggs number two to four and are, of course, pure white like all true Swifts' eggs, of a fairly fine texture but almost, or quite, glossless and very fragile for their size. Jourdain gives the average of 81 eggs as 31·1 × 19·2 mm.: maxima 34·3 × 19·5 and 30·1 × 20·5 mm.; minima 27·5 × 20·1 and 30·7 × 17·8 mm.

In India this Swift, or a race of it, undoubtedly breeds in many places. Mrs. Cockburn, however, must have been mistaken in her identification of the eggs, as that sent by her to Hume is far too small for that of the Alpine Swift. It was probably that of the Common Indian Swift. Nevertheless, Messrs. Davidson and Wenden record it as permanent in Satara and it certainly breeds there. I have repeatedly had reports as to its breeding at the Gairsoppa Falls and McMaster saw birds evidently breeding about the precipices above which the fort is perched at Chikalda.

Habits. This fine Swift is perhaps not migratory in the same sense as other Swifts are but in the Winter it spreads far and wide over the plains of India and Ceylon, being restricted in the breeding-season to precipitous country and hills where there are suitable breeding-places. Its flight is the fastest of all the true Swifts and very direct, though over water and other places where insects are numerous it flits and circles backwards and forwards much more leisurely. It cannot move at all on the ground and once fallen thereon makes no attempt to escape. Its voice is the loud, shrill trill of the genus but is more mellow and louder than that of our common Indian Swift. Its food consists entirely of insects, captured on the wing, in great part gnats, midges, mosquitoes, etc.

Micropus apus.

Hirundo apus Linn., Syst. Nat., 10th ed., i, p. 192 (1758).

Type-locality: Sweden.

M. a. pekinensis, our Indian form, is paler than the typical race.

(1590) Micropus apus pekinensis.

THE EASTERN SWIFT.

Cypselus pekinensis Swinh., P. Z. S., 1870, p. 435 (Pekin).
Cypselus apus. Blanf. & Oates, iii, p. 165.

Vernacular names. None recorded.

Description. Chin and throat white, sometimes with dark shafts; remainder of plumage dark brown, the forehead sometimes paler; the feathers at the sides and below the throat and on the edge of the wing are obsoletely edged with white.

Colours of soft parts. Iris dark brown; bill black; legs and feet purplish-brown.

Measurements. Wing 160 to 180 mm.; tail 66 to 77 mm.; tarsus about 10 mm.; culmen about 8 mm.

Young birds have the forehead always whitish and the feathers of the crown, under wing-coverts, abdomen and under tail-coverts edged with white.

Distribution. Afghanistan, Baluchistan and Kashmir East to North-Eastern China, Siberia and Manchuria. I twice obtained specimens of this Swift in North Cachar from flocks of some size. Not found anywhere in the plains of India and Burma in Winter but has occurred in the Andamans. On the West this Swift occurs as far as Cyprus, Palestine and Syria, breeding there, and through Asia Minor, Persia, etc. to the Himalayas. In Winter it penetrates into Africa as far South as Somaliland, Egypt and the Southern Sudan.

Nidification. The breeding of this Swift is exactly like that of the Common European Swift. The nests are massive structures of feathers and all sorts of wind-borne rubbish, matted together with the bird's saliva and apparently used for several years so that they become intensely filthy and verminous. The eggs number two or three and are laid from the end of May to the end of June. Smirnoff found it breeding in great numbers at Usinksoe, in Yeneseik and a series sent by him to me with others from East Turkestan, thirty altogether, average 25·1 × 16·07 mm.: maxima **26·5** × 15·2 and 26·4 × **17·0** mm.; minima **23·3** × 16·2 and 26·0 × **15·2** mm.

According to Smirnoff the nests are made in the roofs of houses, both occupied and empty.

Habits. Very much the same as those of the Common Indian Swift, but of rather more powerful flight. In North Cachar it occurred in flocks of considerable size, hawking round for insects in stretches of open grass-land between forested hills. They remained for one or two days and then disappeared. Those obtained by me were shot from my garden and the birds roosted that night in the thatch of my house and in the roofs of the adjacent stockade buildings.

(1591) Micropus murinus murinus.

THE PALE BROWN SWIFT.

Cypselus murinus Brehm, Vogelfang, p. 46 (1855) (Egypt); Blanf. & Oates, iii, p. 166.

Vernacular names. *Chumro* (Sind=Common Swift).

Description. Whole plumage pale smoky or mouse-brown; the chin and throat albescent and grading into the surrounding brown; the under plumage at all ages has the feathers tipped white and sub-tipped darker brown.

Colours of soft parts. Iris brown; bill black; legs and feet dull livid purple.

Measurements. Wing 162 to 170 mm.; tail 65 to 70 mm.; tarsus about 9 mm.; culmen about 7 mm.

Young birds have the pale edgings and dark sub-tips more conspicuous than in the adult.

Distribution. Egypt, through Arabia and Mesopotamia to Sind, Baluchistan and South Persia. Hume obtained two specimens of this Swift at Karachi and Butler records seeing Swifts over Hyderabad which may have been this species.

Nidification. Currie found this Swift breeding in great numbers at Kerman, South Persia, during the latter half of April and May. The nests were all Sparrows' old nests placed in holes in the mud walls, one to three feet deep and twelve feet upwards from the ground. Ten eggs average 25·5 × 15·9 mm.: maxima **27·0** × 15·6 and 25·0 × **16·6** mm.; minima **23·0** × 15·7 and 26·4 × **15·6** mm.

Habits. Those of the genus. Currie says that it is migratory in Persia, arriving in March and disappearing in August or early September.

(1592) Micropus acuticaudus.

THE KHASIA HILLS SWIFT.

Cypselus acuticauda Blyth, Ibis, 1865, p. 45 (Nepal).

Vernacular names. None recorded.

Description. Whole upper plumage, including the rump, deep black, slightly glossed with metallic; chin and throat white streaked with black; under tail-coverts black; remainder of lower plumage dull black, each feather margined with white.

Colours of soft parts. Iris deep brown; bill black; legs and feet fleshy-white or pale plumbeous white.

Measurements. Wing 167 to 174, once 177 mm.; tail 70 to 74 mm.; tarsus about 16 mm.; culmen about 7·5 mm. The depth of the fork of the tail is about 21 to 26 mm.

Nestlings have very broad white margins to the feathers of the underparts and traces of pale edges to the scapulars, back and

wing-coverts. The amount of white on the lower parts of the adult birds varies very greatly, perhaps according to age.

Distribution. The type came from Nepal and a second specimen in the Tring Museum was obtained by Elwes from Cherrapoongi in the Khasia Hills, where in 1906 and subsequent years I obtained many specimens.

Nidification. This Swift breeds in colonies of some size on the precipitous hills of Cherrapoongi and Lilancote in the Khasia Hills. The site selected is invariably a perpendicular sheet of rock broken into crevices in which the Swifts build their nests, much like those of the Common European Swift. Any wind-blown material is used, such as straw, feathers, seed-down, etc. which are all matted together with earth and saliva and then covered with a thick mat of feathers only. The eggs number two to four, the latter number being by no means unusual, and are indistinguishable from those of *M. p. pacificus*. Fifty eggs average 26·0 × 16·3 mm.; maxima 27·1 × 16·2 and 26·4 × 17·0 mm.; minima 24·3 × 16·8 and 25·0 × 14·9 mm.

The nests are built close together, sometimes half-a-dozen in one crevice and two or more actually touching one another. They are indescribably dirty and verminous and, judging from their appearance, must be used year after year.

The normal breeding time is about 25th March to end of April.

Habits. The habits of this Swift are still but little known. When I went to the Khasia Hills I made great efforts to locate it round about Cherrapoongi, where Elwes obtained his specimen. Finally a Khasia brought in to me a mass of Swifts' nests and eggs with two specimens of the birds themselves. This was in 1906; in 1907 and 1908 I procured a considerable number more, but in 1909 I never saw a bird. They generally appear first at the breeding haunts in the end of February or in early March and remain until the young are ready to fly in June and July, after which they disperse and, for a few days, specimens may be seen over any of the higher plateaus and hills; they then disappear and are not seen again until the following year, when they reappear all at once at their accustomed haunts. Some years they keep away altogether and in some years very few birds turn up. In flight and habits generally they very closely resemble *M. p. pacificus*, but during the breeding-season keep extremely close to the cliffs where they breed, not hawking for food far from their nests as so many other Swifts do. If the first eggs are taken and destroyed, they lay again in the same place and those birds which have late young remain behind and do not leave with the bulk of the flocks when they disperse, remaining until August or even later. Whether they migrate or not is not known, but probably their movements are only local. Elwes obtained his single specimen in September and I have seen flocks of Swifts in December and January which may have been either this bird or true *M. pacificus*.

Micropus pacificus.

Key to Subspecies.

A. Larger, wing over 160 mm.; legs and feet dark colour.
  a. Larger, wing 168 to 195 mm.; chin and throat very narrowly streaked with black.. *M. p. pacificus*, p. 329.
  b. Smaller, wing 163 to 172 mm.; chin and throat with broad streaks of black ..... *M. p. cooki*, p. 330.
B. Smaller, wing 160 mm. or under; legs and feet very pale ..... *M. p. leuconyx*, p. 331.

(1593) Micropus pacificus pacificus.

The Large White-rumped Swift.

Hirundo pacifica Lath., Ind. Orn. Suppl., p. 58 (1801) (Australia).
Cypselus pacificus. Blanf. & Oates, iii, p. 167.

Vernacular names. None recorded.

Description. A broad band of white across the rump, the feathers more or less black-shafted and smeared with brown; remainder of upper plumage, wings and tail blackish-brown, the back, upper tail-coverts and wing-coverts sometimes with a faint gloss; chin and throat whitish with narrow black shaft-stripes; remainder of lower plumage brown with broad white edges and dark subterminal bars at all ages.

Colours of soft parts. Iris dark brown; bill black; legs and feet dark purplish-black.

Measurements. Wing 168 to 195 mm.; tail 72 to 81 mm.; tarsus about 10 to 11 mm.; culmen 7 mm.

Young birds have pale edges to the feathers of the upper parts and the dark and white terminal patches broader and bolder on the lower plumage.

Distribution. Breeding in Mongolia, Baikal, Amur, North China to Japan. In Winter South to Assam, Manipur, Burma and South China.

Nidification. The Large White-rumped Swift breeds principally in June, making a typical swift's nest of feathers, straw, grass, etc. fastened together with saliva and always much mixed with odds and ends of other things. In Japan Owston describes it as breeding in large colonies on rocky cliffs, often quite inaccessible, the nests being built in clefts or against the rock-face. Sometimes the nests are scattered about singly, at other times in dense clusters. In Manchuria Smirnoff says that they breed in old buildings as well as in cliffs. The eggs number two or three and thirty eggs average 26·1 × 16·6 mm.: maxima 27·5 × 17·3 mm.; minima 25·0 × 15·3 mm.

Habits. This Swift arrives in India about September but in greater numbers in October and November, leaving again in March

and early April. They are generally to be seen in flocks of some size but occasionally in pairs or singly. Their note, uttered as they fly, is the usual screaming call of the genus, louder and more penetrating than most. The flight is very powerful and swift but in the evenings they may often be seen hawking for insects, especially over water, in a more leisurely manner.

(1594) Micropus pacificus cooki.

THE BURMESE WHITE-RUMPED SWIFT.

Cypselus pacificus cooki Harington, Bull. B. O. C., xxxi, p. 56 (1912) (Gokteik, N. Shan States).

Vernacular names. None recorded.

Description. Similar to the Common White-rumped Swift but darker and more glossed with greenish above; below, the chin and throat have very broad dark shaft-stripes. The white rump-band is also more broadly streaked with black.

Colours of soft parts. Iris dark dull brown; bill, legs and feet black (*J. P. Cook*).

Measurements. Wing 163 to 172 mm.; tail 67 to 73 mm.; tarsus about 11 mm.; culmen about 7 mm. In this race the first primary is longest, or the first and second subequal, whereas in *M. p. pacificus* the second is longest.

Distribution. At present only known from the Northern Shan States, where it was discovered by Cook and from the Southern Shan States, where it was obtained by Thompson and Craddock. There is also one specimen in the British Museum obtained by Davison at Amherst, whilst in the Tring Museum there are specimens from the Tsinling Mountains, Selangor and Margherita in Assam.

Nidification. Harington and Cook found the bird breeding in thousands in caves in the Gotiek Gorge, many making their nests in the walls of the caves in the rocks which span the Gotiek River and over which a railway-bridge runs. A nest which had fallen was saucer-shaped, made of leaves and grasses matted together with saliva. The nests were inaccessible to human beings but were freely robbed by bats which sucked and then dropped the eggs. Two of these picked up by Cook measured $25{\cdot}0 \times 16{\cdot}6$ and $25{\cdot}1 \times 15{\cdot}2$ mm. They are also said to breed in vast numbers in limestone caves all over the Shan States and in railway-tunnels running through rock. Livesey noticed it breeding in the nests of *Hirundo striolata* in caves in the same States.

The breeding months are May, June and early July. It seems probable that this Swift will eventually prove to breed over a wide stretch of the sub-Himalayas.

Habits. This seems to be a sedentary form of Swift. Harington found it round about its breeding haunts from February to October and Cook noticed it hawking round other breeding places

in November and December. At the same time it probably wanders far in the Winter but, owing to its resemblance to the preceding form, has been overlooked. In flight, call, food, etc. it is said exactly to resemble that bird but to have slightly slower flight.

(1595) Micropus pacificus leuconyx.

BLYTH'S WHITE-RUMPED SWIFT.

Cypselus leuconyx Blyth, J. A. S. B., xiv, p. 212 (1845) (N.W. Himalayas); Blanf. & Oates, iii, p. 167.

Vernacular names. None recorded.

Description. Similar to *M. p. pacificus* but much smaller and with pale flesh-coloured feet and legs.

Colours of soft parts. Iris dark brown; bill black; legs and feet pale flesh-colour, the claws darker.

Measurements. Wing 147 to 160 mm.; tail 65 to 71 mm.; tarsus about 11 mm.; culmen about 7 mm.

Distribution. From Mussoorie and Murree in the North-West Himalayas to Sikkim and Bhutan. Jerdon states that he got several in Malabar and one specimen in the western part of the Deccan, but it has not been seen by anyone else in either of these districts. I found it breeding in the Khasia Hills and it was probably resident there.

Nidification. Mackinnon first found this Swift breeding about Mussoorie, then Rattray and Buchanan took eggs in the Murree Hills, Whymper near Naini Tal in 1908, and finally I found it breeding in the Khasia Hills. Whymper found it laying in the nests of *Delichon nepalensis* on a high cliff at about 4,000 feet. Except in this instance the nests have all been in deep crevices in boulders and rocks on mountain-sides, deep ravines and in one case on the side of a hill just below a village. The nests in the crevices were just like those of *Micropus a. subfurcatus*, cups or half-cups of grass and feathers mixed with inspissated saliva, very strong and tough. The eggs number two or three and nine of them average 22·8 × 15·1 mm.: maxima **23·3** × 14·8 and 23·2 × **15·4** mm.; minima **22·0** × 15·4 and 23·0 × **14·6** mm. It is curious that both Buchanan and Rattray took clutches of pigmy eggs of this species, both second layings.

They lay from the middle of May to the end of July.

Habits. The same as those of *M. p. pacificus*. This bird is almost certainly resident wherever found, but there is practically no evidence one way or the other. In Assam it is resident without doubt though making local moves. In the Murree Hills Rattray informs me that it is to be seen throughout the year, yet Jerdon "obtained one specimen in the Deccan and saw others in Malabar." It occurs in small flocks and breeds either singly or a few pairs together.

Micropus affinis.

Key to Subspecies.

A. Tail practically square.
  a. Crown brown, forehead and anterior crown more grey but not white and with no trace of supercilium ..... *M. a. affinis*, p. 332.
  b. Crown and forehead all brown..... *M. a. nipalensis*, p. 334.
  c. Hind crown grey-brown, grading to grey on fore-crown and to whitish on forehead, often with a trace of white supercilium ..... *M. a. galilejensis*, p. 334.
B. Tail slightly but obviously forked ..... *M. a. subfurcatus*, p. 335.

An examination of the fine material available in the British Museum shows that we cannot possibly retain all the Indian Swifts under the two names *affinis* and *subfurcatus*. *Affinis*, which was named by Gray from one of Hardwicke's birds obtained on the Ganges, is depicted with a distinctly pale head and forehead and without any intense black on the back. This is typical of the North-West Indian bird which extends to the dry areas as far East as Bihar and perhaps the extreme dry Western districts of West Bengal. We may restrict the type-locality to Cawnpore. Ticehurst has shown (Ibis, 1923, p. 35) that birds from Sind and the Afghan and Baluchistan boundaries are typical *galilejensis* from Palestine and are paler with still whiter foreheads. Birds from Eastern India and from South-West India are, however, much darker, the whole crown brown with no trace of a grey forehead; these will bear the name *nipalensis* of Hodgson. Birds from Ceylon are darkest of all, the crowns black rather than brown.

(1596) Micropus affinis affinis.

The Common Indian House-Swift.

Cypselus affinis Gray, Ill. Ind. Zool., i, pl. 35, fig. 2 (1832) (Ganges, restricted to *Cawnpore*); Blanf. & Oates, iii, p. 168 (part).

Vernacular names. *Ababil*, *Babila* (Hind.); *Pakoli* (Mahr.); *Hawa bil-bil* (Saharunpore); *Wæhaelaniya*, *Læniya* (Cing.).

Description. Crown light brown paling to greyish on the fore-crown and forehead; a black spot in front of the eye with a paler, more grey, line above; lores, sides of the head, neck, wings and tail dark brown; the wing-feathers, until abraded, with very narrow pale margins; back very dark brown, blackish in the centre with a bluish gloss; a broad white band across the rump, sometimes with narrow black shaft-lines; chin and throat white, also sometimes with dark shaft-lines; remainder of lower plumage dark brown, faintly glossy, paler on the under tail-coverts.

Colours of soft parts. Iris deep brown or hazel; bill black; legs and feet vinous brown, purplish-brown to almost black.

Measurements. Wing 122 to 135 mm.; tail 38 to 43 mm.; tarsus about 9 to 10 mm.; culmen 6 to 7 mm.

Distribution. North-West Provinces except along the Afghan and Baluchistan boundaries; Punjab, United Provinces, Bihar, extreme Western Bengal, South to Belgaum, Rajputana, Deccan, and Central Provinces.

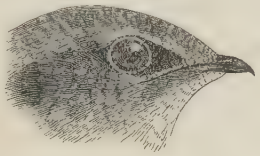

Fig. 57.—Head of *M. a. affinis*. ½.

Nidification. The Indian House-Swift breeds over the whole of its area in the Plains and up to 7,000 feet in the Outer Himalayas, but usually keeps below 5,000 or 5,800 feet. It breeds normally in small colonies in buildings of any sort—hotels in the middle of big cities, huts in villages, old temples, mosques, etc., or in some instances in caves or against the sides of cliffs. The nests are made of any material the Swifts can catch in the air, naturally most often feathers, and these are firmly cemented together with saliva. In shape the nests vary from shallow saucers, as when on rafters, etc., to complete cups or half-cups plastered against wall, eaves of houses or rocks. Sometimes the nests are built singly but more often in small or big clusters, one up against the others. The eggs vary from two to four, once five (*Barnes*), but two is the number most often laid. One hundred eggs average 22·2 × 14·2 mm.: maxima **24·1** × 14·2 and 22·0 × **15·1** mm.; minima **20·1** × 14·0 and 23·0 × **13·0** mm. In shape they are long ovals and in texture smooth but glossless and rather fragile.

They breed from February to September in the Plains and have two or more broods, but in the Hills breed from March to June.

Habits. Much the same as those of the Common Swift but our Indian birds are not migratory, though there are certain local movements due to local conditions and they possibly also leave the higher ranges above 4,000 feet from November to February or early March. Flight and voice are like those of the Common Swift but feebler and their shrill screams, even when breeding, are neither so shrill nor so persistent. They feed largely on gnats and mosquitoes and may be seen hawking them up to a very late hour in the evening.

(1597) Micropus affinis galilejensis.

THE COMMON PALESTINE HOUSE-SWIFT.

Cypselus galilejensis Antinori, Naumannia, 1855, p. 307 (Palestine).
Cypselus affinis. Blanf. & Oates, iii, p. 168 (part).

Vernacular names. *Ababil*, *Babila* (Hind.); *Chumro* (Sind).

Description. The whole plumage rather paler than in typical *M. a. affinis*; the forehead especially often almost white, the pale eyebrow sometimes running back to form a supercilium; the grey of the fore-crown extends further back.

Colours of soft parts as in the typical form.

Measurements. Wing 127 to 133 mm.; culmen about 6 mm.

Distribution. Palestine, Arabia, Asia Minor, Caucasus, Persia South to Afghanistan, Baluchistan, Sind and portions of North-West Provinces.

Nidification. Similar to that of the preceding bird. Ticehurst found them extremely common in Karachi, breeding in colonies in the houses of that city. The eggs are not distinguishable from those of the preceding species.

Habits. Those of the species.

(1598) Micropus affinis nipalensis.

THE NEPAL HOUSE-SWIFT.

Cypselus nipalensis Hodgs., J. A. S. B., v, p. 780 (1836) (Nepal).
Cypselus affinis. Blanf. & Oates, iii, p. 168 (part).

Vernacular names. *Batasi* (Pahari, Sikkim).

Description. A much darker bird than either of the preceding, the crown wholly brown with no trace of grey and the general tone of wings, tail and lower plumage a deeper blacker brown.

Colours of soft parts. As in the other races, but the legs and feet are often almost black.

Measurements. Wing 124 to 134 mm.; tail 39 to 44 mm.; tarsus about 9 to 10 mm.; culmen about 6 mm.

Distribution. Nepal, East to Kamrup in Assam and Bhutan; Bengal, Duars, Orissa to Madras; South Deccan, Southern Bombay Presidency from a little South of Belgaum, Mysore and Travancore. Ceylon birds are very dark.

Nidification. Not distinguishable from that of the two preceding birds. In Ceylon they breed in caves, railway tunnels, arches over rivers, etc. quite as much as in buildings and the principal breeding months are February and March, but Wait records nests up to July. In Malabar and Travancore they are early breeders also but in Bengal they breed from February up to the end of September and have several broods, occupying the same nest

throughout the whole time until it becomes very dirty and full of lice. In the South they seem to lay two eggs only, rarely three, but in the North lay two to four.

Habits. Those of the species.

(1599) Micropus affinis subfurcatus.

THE MALAY HOUSE-SWIFT.

Cypselus subfurcatus Blyth, J. A. S. B., xviii, p. 807 (1849) (Penang) Blanf. & Oates, iii, p. 169.

Vernacular names. *Dao-hadi* (Cachari).

Description. Much darker than any of the other races of this Swift, the head, back, wings and tail being all blackish-brown, merely a little paler brown on the forehead; the breast, flanks, abdomen and under tail-coverts are all blackish-brown.

Colours of soft parts. Iris dark brown; bill black; legs and feet purplish-black to black.

Measurements. Wing 130 to 142 mm.; tail 44 to 47 mm.; tarsus about 9 to 10 mm.; culmen about 6 mm.

The outer feathers of the tail vary from 4 to 7 mm. longer than the central ones.

Young birds have the feathers of the lower parts fringed with white and the feathers of the tail-coverts, under wing-coverts and axillaries also tipped with white though not quite so strongly.

Distribution. Assam; Chittagong and Comilla in Eastern Bengal; Manipur, Lushai, the whole of Burma, Yunnan, Shan States, Siam, the Malay Peninsula, Sumatra and Borneo. It extends East as far as Amoy in China and is probably found throughout the Indo-Chinese countries wherever suitable.

The small structural difference in the shape of the tail, a feature which varies greatly individually, does not appear to me to be of specific importance in this group of Swifts. *M. a. subfurcatus* is undoubtedly the Burmese representative of *M. a. affinis*, and I prefer to treat it as a geographical race.

Nidification. In Assam these Swifts breed during May and June, a few colonies as early as April and others as late as July, but I do not think they have more than one brood. Here also they breed entirely on cliffs, often in colonies of many hundreds, and in most inaccessible places. In Burma and China, however, they build far more often in houses and buildings than on cliffs, etc., the colonies being smaller but each pair having two or more broods and breeding from April to August, sometimes also in February and March. They seem most often to lay three eggs but two and four are not unusual; they cannot, of course, be distinguished from those of the other races. Fifty eggs average 22·7 × 14·9 mm.: maxima **24·5** × 14·3 and 24·0 × **16·1** mm.; minima **21·0** × 15·0 and 21·1 × **14·2** mm.

Habits. Those of the species, though possibly this race is more of a jungle bird and less exclusively a haunter of civilization than the other races. It is resident wherever found.

Genus TACHORNIS.

Tachornis Gosse, B. of Jamaica, p. 58, pl. 9 (1847).

Type, *Cypselus parvus* Licht. (African).

In this genus of small Swifts the toes are arranged in pairs, the third and fourth toes outward, the first and second (inner and hind) inward; the tail is long and is forked in varying degree. The sexes are alike.

Fig. 58.—Left foot of *T. b batasiensis*. ½.

Tachornis batasiensis.

Key to Subspecies.

A. Tail deeply forked; outer tail-feathers exceeding central feathers by more than 28 mm.
  a. Darker ..... *T. b. batasiensis*, p. 336.
  b. Paler ..... *T. b. palmarum*, p. 338.
B. Tail less deeply forked; outer tail-feathers exceeding central feathers by less than 26 mm. ..... *T. b. infumatus*, p. 338.

The name of this little Swift was first written *balasiensis* but the name is derived from the Bengali name *batassia* and is obviously a misprint and the amended name *batasiensis* must be accepted.

Gray, in using the Bengali name, may be inferred to have applied it to the Bengali bird and the type-locality can therefore be restricted to Calcutta, thus leaving the name *palmarum* free for the paler Western form depicted in Hardwicke's Illustr. of Ind. Zool.

(1600) Tachornis batasiensis batasiensis.

THE BENGAL PALM-SWIFT.

Cypselus balasiensis (misprint) Gray, in Griff. An. King., ii, p. 60 (1829) (India, restricted to Calcutta).
Tachornis batassiensis. Blanf. & Oates, iii, p. 170 (part).

Vernacular names. *Batassia*, *Chamchiki* (Beng.); *Ambattan Kathi* (Tamil).

Description. Whole upper plumage dull brown, the tail and the outer web of the wing-quills darker in freshly-moulted birds and the head nearly always a little darker than the neck; lores, sides of the head and neck and whole lower plumage light smoky-brown, occasionally a little paler on the chin and throat.

Colours of soft parts. Iris red-brown to hazel-brown; bill black; legs and feet blackish- or purplish-brown.

Measurements. Wing 113 to 119 mm.; tail 61 to 66 mm.; tarsus about 8 mm.; culmen 4 to 5 mm.

Distribution. Bengal and South-Western Bihar, Assam North of the Brahmaputra as far East as the Dibong; Orissa, Madras and Ceylon. Birds from Travancore appear to belong to this race and it is probable that all birds from the wetter areas of South-West India and the Malabar coast will be found to agree with this race rather than with the paler race of the drier regions of India.

Nidification. In Bengal these tiny Swifts breed from November to March or early April; in Bihar they breed from March to June and in Northern Assam in June and July. At the same time over the whole of this range they appear to breed at odd times in addition to the months mentioned. In Ceylon they are said to breed from October to April. The nests are always fastened to the under surface of a palm-leaf, generally that of a Toddy-palm, sometimes in a Betel-, Date- or Coconut-palm. Hume says that he seldom found more than two or three nests in each palm but in Bengal, though one often found only two or three pairs occupying a tree, I have also found about a dozen and sometimes even large colonies in one tree, especially where suitable palms are scarce. The nest is a tiny purse of light down, very often of the *Bombax*, matted and twisted together but very soft except at the rim and back. The rim is stiffened with saliva into a sort of cord, strong enough to bear the weight of young and old, whilst the back is saturated with saliva and thus firmly glued to the palm-leaf. I have always found two to be the normal clutch of eggs, three occasionally only, but other observers speak of three or four and even five. They are tiny white, fragile eggs, very long ovals and often very pointed. Twenty-five average 18·2 × 11·5 mm.: maxima **19·1** × 11·5 and 18·3 × **12·1** mm.; minima **16·6** × **10·3** mm.

Both sexes assist in incubation.

Habits. This is a most familiar, resident, little Swift, haunting gardens and compounds even in the heart of big cities. They are particularly fond of the Palmyra-palm and where these are scarce they are a sure find for this bird but they haunt other palm-groves also and, when not breeding, may be found almost anywhere in open country. Their flight is typically Swift-like but they fly low and dodge backwards and forwards more constantly, uttering a little trilling cry which reminds one of the scream of the larger Swifts, though it is much more musical. When breeding they seem to keep very close to their own particular tree, wheeling

round about it for hours together, every few minutes visiting their nests and invariably trilling as they do so. Though midges form their staple diet I have seen them hawking small white moths and also small coleoptera, whilst termites they, like all other birds, eat greedily.

(1601) Tachornis batasiensis palmarum.

THE WESTERN PALM-SWIFT.

Cypselus palmarum Gray in Hardw., Ill. Ind. Zool., i, pl. 35, figs. 1 *a* & 1 *b* (1832) (Cawnpore).
Tachornis batassiensis. Blanf. & Oates, iii, p. 170 (part).

Vernacular names. *Tari ababil*, *Tal chatta*, *Patta deuli* (Hind.); *Ambattan Kathi* (Tam.); *Wœhœlaniya* (Cing.).

Description. A much paler bird than the preceding, the lower parts albescent smoky-brown, the lores, chin and throat generally still paler; the forehead and eyebrow also often show up paler than the crown.

Colours of soft parts as in the preceding race.

Measurements. Wing 107 to 122 mm. Other measurements as in the preceding bird.

Distribution. The whole of the North-West of India as far East as Chota Nagpore and Lohadaga in Western Bengal and to West Bihar; South to about Belgaum in the Bombay Presidency and the Deccan. On the limits of its range this race merges into the preceding form but, on the whole, we have two definite forms, the darker of which inhabits the more humid, well-forested tracts, whilst the paler is found in those tracts where the rainfall is less and the rainy seasons more restricted.

Nidification. Apparently these birds breed irregularly from March to September and they may have two broods. Otherwise there is nothing to remark on in the nesting arrangements, which are exactly like those of the preceding race.

Habits. The same as those of the typical form.

(1602) Tachornis batasiensis infumatus.

THE EASTERN PALM-SWIFT.

Cypselus infumatus Sclater, P. Z. S., 1865, p. 602 (Bangermassing, Borneo).
Tachornis infumatus. Blanf. & Oates, iii, p. 171.

Vernacular names. *Pyan-hlwa* (Burmese); *Dao-hadi kashiba* (Cachari).

Description. In addition to having a shorter, less forked tail, this race is much darker than either of the two preceding birds; the upper parts are blackish-brown, the wing-quills and tail practically black with a slight gloss; below, the plumage is dark

brown, sometimes slightly paler and greyish on the chin and throat.

Colours of soft parts. Iris brown; bill and feet black.

Measurements. Wing 113 to 126 mm.

Distribution. Assam South of the Brahmaputra and East of the Dibong; Manipur, Lushai Hills, Burma from the Chin and Kachin Hills to the extreme South, Malay States, Sumatra, Borneo, Java, Shan States, Yunnan, Siam and Hainan.

Nidification. In the Hills South of the Brahmaputra this Palm-Swift is very numerous, breeding in the thatch roofs of the houses of the various Hill Tribes. The nest is just like that of *T. b. batasiensis* but is built on one of the lower layers of grass or bamboo-leaves forming the thatch; over this hang the upper layers. It is always placed at the end of a tunnel in the thatch, sometimes a few inches long only, sometimes a couple of feet. Very rarely it is made in the straggling thatch hanging down from the edge. In Burma often and in the plains of Assam occasionally the nests are built in palm-trees. In the villages one or two pairs generally occupy each house but I have seen at least a dozen pairs breeding in one roof and one large colony of thirty or forty pairs shared one palm and one thatched bungalow between them. The normal clutch is two but three are often laid, never more. Fifty eggs average 17·1 × 11·7 mm.: maxima **18·1** × 12·1 and 17·6 × **12·2** mm.; minima **16·2** × 11·2 and 16·8 × **10·9** mm.

The breeding-season lasts from April to June in the Hills and from early March to August in the Plains.

Habits. Generally speaking those of the other races but this bird, though breeding in villages, is a jungle bird and even if it likes open spaces, cultivated fields, etc. to hawk over for insects, prefers such of these as are surrounded by forest. It is a very tame little bird and passes in and out of the Naga houses within a few inches of the inhabitants.

Subfamily CHÆTURINÆ.

This Subfamily contains those species of Swifts which have spiny shafts to the rectrices and the little Swiftlets which make edible nests. The tarsi are naked; the second toe has three, the third four and the fourth toe five phalanges.

Key to Genera.

A. Shafts of tail-feathers spiny.
  a. Larger. Wing over 180 mm.; centre of back paler ..... HIRUNDAPUS, p. 340.
  b. Smaller. Wing under 130 mm.; centre of back not paler than surrounding part.
    a'. Abdomen white ..... INDICAPUS, p. 344.
    b'. Abdomen black ..... RHAPHIDURA, p. 345.
B. Shafts of tail-feathers not spiny ..... COLLOCALIA, p. 346.

Genus HIRUNDAPUS.

Hirundapus Hodgs., J. A. S. B., v, p. 780 (1836).

Type, *Chætura nudipes* Hodgs. (a subsp. of *C. caudacuta*).

In this genus the tail-feathers, which are normally very stiff and unyielding, have rigid prolongations of the shafts, forming spines which project some distance beyond the webs; the tarsi are naked and the toes are all directed forward as in *Micropus*; the claws are strong and much curved; the wings very long with the first primary longest.

The name *Chætura*, by which all Indian species have hitherto been known, cannot be used, as it was first applied to an African species *pelagica*, which is obviously generically different. *Hirundapus*, originally spelt thus by Hodgson, is the next available name.

Key to Species.

A. Webs of tail-feathers rounded at the tips .. *H. caudacutus*, p. 340.
B. Webs of tail-feathers drawn to a point at the tips ..... *H. giganteus*, p. 342.

Hirundapus caudacutus.

Hirundo caudacuta Lath., Ind. Orn., Suppl., p. 57 (1801).

Type-locality: Australia.

The typical form differs from those found in Indian limits in having the forehead pale or whitish and the pale portions of the back grading into the darker neck, more grey and less brown.

Key to Subspecies.

A. Chin and throat pure white. Wing over 195 mm. ..... *H. c. nudipes*, p. 340.
B. Chin and throat smoky-grey. Wing under 185 mm. ..... *H. c. cochinchinensis*, p. 342.

(1603) Hirundapus caudacutus nudipes.

The White-throated Spinetail.

Chætura nudipes Hodgs., J. A. S. B., v, p. 779 (1836) (Nepal); Blanf. & Oates, iii, p. 172.

Vernacular names. *Silli-ang tiphi-timbo* (Lepcha); *Dao-hadi-gadeba* (Cachari).

Description. A raised spot in front of the eye and feathers round the eyes velvety-black; crown, sides of the head and neck, sides of the rump, upper tail-coverts and tail black, glossed with metallic blue and blue-green; back brown, the centre almost white, the edges darker, grading into the surrounding black; innermost secondaries with most of the inner webs pure white; remainder of wing black, glossed everywhere with deep blue except

on the inner webs of the quills, which are pale-edged; the outer webs of the innermost secondaries have the gloss green instead of blue; chin, throat and under tail-coverts pure white; a patch on the flanks marked with white; remainder of lower parts dark brown.

Colours of soft parts. Iris dark brown; bill black; legs and feet blackish-purple or purple-slate, the claws black.

Measurements. Wing 196 to 209 mm.; tail 51 to 57 mm.; tarsus about 17 mm.; culmen 7 to 8 mm.

The difference in plumage between freshly-moulted and abraded birds is very great in all species of Spinetails. In the latter condition the wings and tail lose their gloss and the whole of the back and neck become almost uniform dull pale brown.

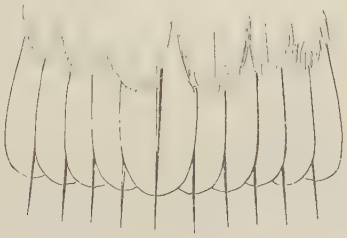

Fig. 59.—Tail of *H. c. nudipes*. ½.

Distribution. The Himalayas from Hazara to Eastern Assam, Cachar, Sylhet and Manipur.

The overlapping in area between *nudipes* and *cochinchinensis* and the fact that they evidently both breed in this area makes it doubtful whether they should not be treated as species rather than subspecies. Until, however, nests are actually obtained I leave the two as representative large and small races of the same species whose normal breeding-range is North and South respectively.

Nidification. Nothing is known of the breeding of this bird beyond the fact that I obtained a single oviduct egg in North Cachar measuring 31·2 × 22·4 mm., a good deal larger than an oviduct egg of *H. c. cochinchinensis*, also obtained in that district. Where this bird, *nudipes*, was shot there was an immense area of park-like country, rolling hills covered with grass, at that time a few inches high, scattered everywhere with fine Oak-trees, many of which were hollow. In view of Stewart's later discoveries, it seems very probable that these Swifts were breeding in these hollow trees whilst I was wasting my time hunting for them in caves and limestone quarries.

Habits. This magnificent Swift is sedentary, if such a term can be applied to a bird who may feed a couple of hundred miles from its roosting-haunts and whose powers of flight enable it to cover that distance in about an hour. It is a silent bird but every now

and then utters a very loud screaming cry as it hurtles through the air with a "swish" of wings only comparable to the sound of a Peregrine in the act of stooping. When hawking insects over water their flight is much less swift and they often float for a few seconds on widespread wings or playfully twist backwards and forward at a pace which, though incredible in other birds, in them seems but the lazy grace of a wonderful power. They are present in North Cachar all the year round, always in flocks whatever the season but it is only in certain areas that they may always be met with and even then only late in the evenings. Their food is entirely insectivorous and taken on the wing, consisting in great proportion of small bees. They may roost in hollow trees sometimes but others at all events roost in great numbers on limestone cliffs, where they sleep not only on the tiny ridges but apparently also on the almost vertical, though rough and broken, sides.

(1604) Hirundapus caudacutus cochinchinensis.

THE COCHIN CHINA SPINETAIL.

Chætura cochinchinensis Oust., Bull. Soc. Philom., 1878, p. 52 (Saigon, Cochin China).

Vernacular names. *Dao-hadi-gadeba* (Cachari).

Description. Differs from the preceding subspecies in having the chin and throat grey and in being darker both above and below.

Colours of soft parts as in *H. c. nudipes*.

Measurements. Wing 183 to 184 mm.; tail 48 to 49 mm.; tarsus about 16 mm.; culmen about 8 mm.

Distribution. Khasia Hills, Cachar, Manipur, Malay States, Sumatra and Cochin China.

Nidification. I published a long account of the breeding of this bird under the name of *Chætura indica* but eventually the birds described proved to be the present species. I found them in North Cachar breeding in deserted limestone quarries, in the small dark tunnels leading from one quarry to another. The nests were large, shallow oval cups, the walls of the cave forming the back, composed almost entirely of scraps of moss and moss roots taken from a bed of moss made by bears, many long hairs of these animals being mixed with the moss. The material was not only quite well interwoven but was matted together with saliva, making a very strong compact nest. I found only a remnant of eggs and two young ones but later I shot a female containing an egg almost ready to lay which measured $28{\cdot}1 \times 21{\cdot}0$ mm. The nests and young were found on the 26th April and the oviduct egg was obtained on the 28th May, so that probably the normal breeding-season is February and March.

Habits. Those of the genus. These birds are never to be seen in the heat of the day and it is very possible that they retire to

hollow trees both to rest and to escape the sun, but at that time Mr. Stewart had not found out how *H. g. indicus* occupies hollow trees and I never thought of examining the great hollow Oak-trees which are numerous everywhere in that part of North Cachar.

Hirundapus giganteus.

Cypselus giganteus Temm., Pl. Col., 364 (1825).

Type-locality: Java.

The typical form, *H. g. giganteus*, differs from *H. g. indicus* in having no white patch in front of the lores.

(1605) Hirundapus giganteus indicus.

The Brown-throated Spinetail.

Chætura indica Hume, Str. Feath., i, p. 471 (1873) (Andamans); Blanf. & Oates, iii, p. 173.

Vernacular names. *Dao-hadi-gadeba* (Cachari).

Description. A large round black spot in front of the eye and in front of this a broad white patch; forehead, crown and neck, wings, upper tail-coverts, tail and sides of back and rump black with a light metallic-blue gloss; centre of back brown, grading into the surrounding brown; under tail-coverts and a patch on the flanks above the thighs white; remainder of lower plumage dark brown, the bases of the feathers of the chin and throat pale brown and showing through.

Colours of soft parts. Iris dark brown; bill black; feet vary greatly from pale livid flesh-colour to dark purplish-brown; in a few individuals they are slaty-pink and in others almost a lavender-grey.

Measurements. Wing 188 to 194 mm.; tail 54 to 59 mm.; tarsus about 16 mm.; culmen about 8 to 9 mm.

Distribution. Assam, Cachar, Sylhet, Manipur, Andamans, Burma and possibly Northern Malay States; South-West Siam; Southern India and North to latitude 12°.

Nidification. Stewart found this bird breeding in hollow trees in Travancore. These trees were nearly all *Valeria indica*, trees of great size growing in deciduous forest, with not much undergrowth, between 1,000 and 2,500 ft. When old these trees nearly always become hollow and are then resorted to by the Swifts for breeding purposes from the end of February to early April. Each tree serves as a breeding-place for only one pair, or at most two pairs of birds, who make no nest but deposit their eggs in a hollow scratched in the dust and debris at the bottom of the tree, often lower down than the surrounding earth. The trees as a rule have the opening, sometimes a natural one, sometimes a Woodpecker's or Barbet's hole, high up, never low down and the tree has to be cut open at the bottom to effect an entrance. As

soon, however, as a small hole is cut a peculiar odour is at once noticeable if these Swifts are breeding in the tree and if there is no smell the hill tribesmen will not enlarge the opening further. Three to five eggs are laid and Stewart says that if not just laid they are invariably found to be in a most filthy condition. One hundred eggs average 30·7 × 22·2 mm.: maxima **32·1** × 22·5 and 31·2 × **23·5** mm.; minima **28·8** × 22·0 and 29·9 × **20·0** mm. The texture is extremely stout and strong, rather coarse-grained but with a slight gloss when just laid. In shape they are broad ovals, often very blunt at either end. Both sexes apparently assist in incubation.

Habits. This Spinetail is common in Travancore and Kanara as well as South Assam and Northern Burma but except to Bell, Davidson and Stewart very little is known of its habits. Stewart and Bell both state that it roosts in large flocks in hollow trees and that it will sometimes resort to deserted factory chimneys for the same purpose. It also stays in these same retreats during the hotter hours of the day. The Hill Tribesmen hunt the Spinetails with great eagerness, as they consider the flesh if eaten prolongs life and also encourages fertility; indeed, if the supply were constant enough they would become practically immortal. They kill the birds by blocking up the exits above and then lighting fires below and smoking them to death. These Spinetails are resident wherever found, though they travel great distances and move widely locally. In North Cachar I found bees to be their staple diet, though they ate all insects which could be taken on the wing.

Genus **INDICAPUS.**

Indicapus Mathews, B. of Australia, vii, p. 265 (Aug. 1918).

Type, *Acanthylis sylvatica* Tickell.

This genus differs from *Hirundapus* principally in colour-pattern, having no pale centre to the back and in having a broad white rump and grey underparts; the tail is longer proportionately than it is in *Hirundapus* and the feet are very small and feeble; the toes appear to be placed three pointing forward and one backward but they are, of course, all reversible. The genus consists of one species only, which is peculiar to Southern and Northern India.

(1606) **Indicapus sylvaticus.**

THE WHITE-RUMPED SPINETAIL.

Acanthylis sylvatica Tickell, J. A. S. B., xv, p. 284 (1846) (Central India).

Chætura sylvatica. Blanf. & Oates, iii, p. 174.

Vernacular names. None recorded.

Description. A broad band across the rump white, with an occasional black shaft-stripe; remainder of upper plumage black

faintly glossed with blue-green ; the bases of the feathers on the back are brown and show through more or less ; chin, throat, sides of neck, breast and upper flanks greyish-brown passing into white on the lower abdomen, posterior flanks and under tail-coverts.

Colours of soft parts. Iris brown ; bill and legs and feet black.

Measurements. Wing 107 to 115 mm.; tail 34 to 37 mm.; tarsus about 9 mm.; culmen about 4 to 5 mm.

Distribution. The forest country from Cachar and Sylhet, Bengal South to the Godavery and west to the Wyne Gunga; Seoni in the Central Provinces; Garhwal and Sikkim in the Himalayas; South-West India from South Travancore to the Wynaad, Nilgiri and Palni Hills.

Nidification. Bell found these birds breeding inside dead palms in South Bombay and Stewart took many nests and eggs in Travancore from the same kinds of trees as those resorted to by *H. g. indicus* and one from a Toddy-palm. They breed during March and early April and sometimes two or three pairs will use the same tree, making curious little nests entirely of leaf-stems, glued together with inspissated saliva and placed against the inside of the tree at any height from five to thirty feet from the ground, though those found by Bell in palms were always close to the ground. They lay from two to five eggs, which are tiny replicas of those of the larger Spinetails but they always keep clean and have a higher gloss and smoother texture. Sixty eggs average 17·5 × 12·1 mm.: maxima **19·2 × 12·3** mm.; minima **16·0** × 12·2 and 16·9 × **11·5** mm. An abnormally large clutch of five eggs averages 20·1 × 13·1 mm.

Habits. Like the preceding bird this little Spinetail roosts at night and rests during the hotter part of the day in hollow trees, often associating at these times in very large flocks. The flight is very swift but cannot compare with that of the larger Spinetails, nor is it as direct. Their voice is a feeble, rather chirruping edition of that of *Hirundapus* and their food the same as that of these birds. It is probably resident over the greater part of its habitat but moves locally and Stewart does not think it was resident in South Travancore. It is most common between the foot-hills and 2,000 feet but ascends some 1,000 feet higher as long as there are suitable open forests.

Genus **RHAPHIDURA.**

Rhaphidura Oates, B. of Burma, ii, p. 6 (1883).

Type, *Acanthylis leucopygialis* Blyth.

In the genus *Rhaphidura* the whole plumage is black except the rump and upper tail-coverts ; the tail is short, the spines very fine and weak and the upper tail-coverts so long that they cover the whole tail except the spines.

It consists of a single species.

(1607) Rhaphidura leucopygialis.

THE GREY-RUMPED BLACK SPINETAIL.

Acanthylis leucopygialis Blyth, J. A. S. B., xviii, p. 809 (1849) (Penang).
Chætura leucopygialis. Blanf. & Oates, iii, p. 175.

Vernacular names. None recorded.

Description. Rump and upper tail-coverts grey-white with black shafts, remainder of plumage deep black with a blue gloss.

Colours of soft parts. Iris dark brown; bill black; legs and feet livid purple.

Measurements. Wing 108 to 123 mm.; tail 37 to 40 mm.; tarsus about 9 to 10 mm.; culmen about 4 to 5 mm.

Distribution. From the south of Tenasserim through the Malay Peninsula to Sumatra and Borneo.

Nidification. Unknown.

Habits. Similar to those of the preceding bird so far as has been recorded.

Genus COLLOCALIA.

Collocalia Gray, Gen. Birds, p. 8 (1840).

Type, *Collocalia esculenta* Linn.

The genus *Collocalia* contains the small Swiftlets, some of which build the "edible nests" so sought for by the Chinese as an article of food.

The genus differs from the Spinetails in having normal tail-feathers with no projecting spines; the feet are small; the three front toes directed forward and the hind toes, which are partially reversible, directed backward, in this respect much like *Rhaphidura*.

The genus contains numerous species extending over practically the whole of the Oriental and Australian regions.

Key to Species.

A. Abdomen brown like throat and breast.
  a. Tarsi naked.
    a'. No pale band across the rump ..... *C. unicolor*, p. 346.
    b'. A pale band across the rump ..... *C. francica*, p. 349.
  b. Tarsi feathered.
    c'. Rump feathers with no dark stripes .. *C. fuciphaga*, p. 348.
    d'. Rump feathers with dark shaft-stripes. *C. innominata*, p. 349.
B. Abdomen white; tarsi naked ..... *C. linchi*, p. 351.

(1608) Collocalia unicolor unicolor.

THE INDIAN EDIBLE-NEST SWIFTLET.

Hirundo unicolor Jerdon, Madr. Jour. L. & S., xi, p. 238 (1840) (Coonoor Pass, Nilgiris).
Collocalia fuciphaga. Blanf. & Oates, iii, p. 176.

Vernacular names. *Wêhi-lihiniyā* (Cing.).

Description. Whole upper plumage dark brown, darkest on head, wings and tail, sometimes with a very faint purple or green gloss on the two latter; feathers round the eye blackish; the lores paler, in some almost whitish; lower parts greyish-brown, sometimes showing very faint darker shaft-lines.

Colours of soft parts. Iris dark brown; bill black; legs and feet purplish-black.

Measurements. Fork of tail about 10 to 15 mm. deep; wing 105 to 115 mm.; tail 49 to 53 mm.; tarsus about 8 to 9 mm.; culmen about 4 to 5 mm.

Distribution. Ceylon, Travancore, Malabar coast as far North as the Vingorla Rocks; Nilgiris, Palnis, Anamalis and other hill ranges of Mysore. It again occurs in the Simla Hills and there are several specimens from Kotegarh in the British Museum. I can detect no differences between these specimens and others from Ceylon and South India.

Nidification. This Swiftlet breeds throughout its area both on the coast and inland wherever there are suitable rocky caves, whilst it also, especially in Ceylon, makes use of railway tunnels for this purpose. The nests are invariably placed in the darkest part of the site chosen and are built against the walls or roofs either in clusters or singly but generally, especially in the larger colonies, in the former. The nests are small saucers or half-saucers made of inspissated saliva, feathers and other oddments matted together into a very strong glue-like mass. In the hills of Southern India the principal material used is a fine white lichen, on the coast seaweed forms the bulk of the nest and in Ceylon moss, but in all feathers are to be found also. The amount of saliva used varies considerably but the nests are never composed entirely of this material as is the case with some of the other Swiftlets. Such as they are, however, very dirty, full of vermin and comprising perhaps one-tenth to one-quarter only of saliva, they are yearly taken in vast quantities by the natives to be boiled down, strained and used as food. The birds breed in big colonies and the nests taken from one such may vary from 10 to 50 lbs. in weight and fetch quite a fair price on the market. The later nests are not disturbed and the taking of the first lot neither drives the birds away nor tends to diminish their numbers. Two eggs only are always laid, long ovals almost elliptical in shape, of course pure white and much more fragile than the same sized eggs of the small Spinetail Swifts. Eighty eggs average 20·9 × 13·5 mm.: maxima **22·2** × 13·4 and 21·0 × **14·1** mm.; minima **19·7** × 13·1 and 20·3 × **13·0** mm.

The principal breeding months are said to be April and May, but I have also seen eggs taken in March.

Habits. The Indian Edible-nest Swiftlet appears to be resident wherever found, from the level of the sea to at least 7,000 feet on the Nilgiris and other hills. They remain in flocks throughout the year, sometimes numbering five or six hundred birds, sometimes a

dozen or so only. Their flight is more like that of Sand-Martins than the bigger Swifts, less direct and more twisting and turning backwards and forwards. They feed entirely on the wing, taking almost any kind of small flying insect but eating flies and *Diptera* in preference to other kinds.

Collocalia fuciphaga.

Hirundo fuciphaga Thunberg, K. Vet. Acad. Nya Handl., xxxiii, p. 153, pl. 4 (1812).

Type-locality: Java.

The typical form of *fuciphaga* only differs from our Himalayan form *brevirostris* in being smaller, though in the latter the rump is perhaps somewhat lighter than the back.

Oberholser (Proc. Acad. Nat. Sci. Phil., 1906, p. 177) constitutes our *brevirostris* a full species on the ground that there is no gradation in size between it and its nearest allies. We find, however, that whilst the true *fuciphaga* has a wing between 106 and 115 mm., *vestita* has it between 111 and 118 mm., *elephra* 120 to 121 and finally *brevirostris* (Oberholser's series) 124 to 127 mm., whilst the British Museum series measure between 120 and 134 mm.

I agree with Hartert and consider *brevirostris* to be merely a race of *fuciphaga*.

(1609) Collocalia fuciphaga brevirostris.

THE HIMALAYAN SWIFTLET.

Hirundo brevirostris McClell., P. Z. S., 1839, p. 155 (Assam).
Collocalia brevirostris. Blanf. & Oates, iii, p. 177.

Vernacular names. None recorded.

Description. Very similar to the preceding bird but rather darker, with dark lores and the rump a shade paler than the back.

Colours of soft parts. Iris brown; bill black; legs and feet brownish fleshy.

Measurements. Fork of tail about 6 to 12 mm. deep; wing 120 to 134 mm.; tail 55 to 58 mm.; tarsus about 8 mm.; culmen about 4 mm.

Distribution. Himalayas from Naini Tal and Dalhousie to Eastern Assam, Cachar and Manipur. Forrest obtained it at 9,000 feet on the Mekong-Salwin divide and it probably extends in suitable places through the North Chin and Kachin Hills.

Nidification. I found this little Swift breeding in North Cachar in April but most of their breeding places were quite unapproachable. Once some Nagas found it breeding in a hollow cave formed by the buttresses of an enormous fallen Cotton-tree and once we took nests and eggs from a small cave within about thirty

feet of the nest of an *Ægypius monachus* we had climbed down to. The colony in the Cotton-tree numbered about twenty pairs, that in the cave about a dozen. All but three nests had young and most eggs must be laid in early March ; eggs and young numbered two in every case. The nests were very shallow saucers made almost entirely of feathers glued together with saliva and almost solely of this material round the edges and where fastened to the walls of the cave. The caves seemed to have been used for many years, the floor and slope of the cliffs below being densely covered with the birds' droppings. The six eggs procured average 21·8 × 14·5 mm.

Habits. This bird seems to be rare everywhere. The first colony alluded to above was on a cliff at some 2,500 feet elevation but except for this I have only seen them at 4,000 feet upwards. Blanford noticed it at 12,000 feet in Sikkim and Stevens records it as being seen at various elevations between 3,600 and 12,000 feet. The latter notes seeing them in February, May, August and September, so that though they wander greatly and are very erratic in their movements they are evidently non-migratory. The only note I have heard them utter was a low cheep, very like that of a bat. The few I have seen were very tame confiding little birds and we had no difficulty in catching them in butterfly-nets. Those we examined seemed to have eaten nothing but flies, in appearance just like common house-flies.

(1610) Collocalia innominata.

HUME'S SWIFTLET.

Collocalia innominata Hume, Str. Feath., i, p. 294 (1873) (Button Is., Andamans) ; Blanf. & Oates, iii, p. 177.

Vernacular names. None recorded.

Description. Upper plumage blackish-brown, the crown and nape still blacker and sometimes forming a distinct cap; rump paler and more grey, occasionally forming a broad grey band and at other times hardly discernible; the feathers of this part dark-shafted ; lower plumage greyish-brown, the feathers with darker shaft-stripes.

Colours of soft parts. Iris dark brown; bill black; legs and feet brownish-black. Tarsi feathered throughout in front.

Measurements. Tail slightly forked, from 3 to 7 mm.; wing 125 to 132 mm.; tail 52 to 55 mm.; tarsus about 8 mm. ; culmen about 4 mm.

Distribution. Andamans ; South Tenasserim, Selangor and South-West Siam.

Nidification. Unknown.

Habits. Those of the genus.

Collocalia francica.

Key to Subspecies.

A. Smaller; wing 114 mm. or under ..... *C. f. francica*, p. 350.
B. Larger and paler; wing 115 mm. or over.
a. Darker, browner below; rump band obsolete or ill-defined..... *C. f. inexpectata*, p. 350.
b. Paler, more grey below; rump band well defined..... *C. f. germani*, p. 351.

(1611) Collocalia francica francica.

THE LITTLE GREY-RUMPED SWIFTLET.

Hirundo francica Gmelin, Syst. Nat., ii, p. 1017 (1799) (Mauritius).
Collocalia francica. Blanf. & Oates, iii, p. 178 (part).

Vernacular names. None recorded.

Description. Upper parts blackish-brown, wings, tail and crown darkest; rump paler, but merging into the surrounding brown and very ill-defined, each feather with a faintly darker shaft; lower parts pale greyish-brown, the feathers dark-shafted in the younger birds.

Colours of soft parts. Iris dark brown; bill black; legs dark brown.

Measurements. Wing 110 to 114 mm. (once 116, *Stresemann*); tail 43 to 48 mm.; tarsus about 8·5 mm.; culmen about 4 to 4·5 mm.

Distribution. Islands of Mauritius and Bourbon. Once accidental in Ceylon.

Nidification. Breeding in caves round the coast of Mauritius and Bourbon in the manner usual to this genus. The colonies are often of immense size and many hundreds of pairs breed together. The nests are like those of the next bird, made almost entirely of inspissated saliva looking like shallow saucers, or half-saucers of fine strings of isinglass, all matted and half-matted together. These nests measure two to two and a half inches across the widest part and are about half an inch to an inch deep. When the first lot are taken the second nests always have a certain amount of feathers, etc. mixed with the saliva, but even second crop nests of this species are much purer than first crop nests of the other species. The eggs number two as usual and only differ from those of the next race in being smaller.

Habits. Similar to other subspecies of this species.

(1612) Collocalia francica inexpectata.

THE ANDAMAN GREY-RUMPED SWIFTLET.

Collocalia inexpectata Hume, Str. Feath., i, p. 206 (1873) (Button Is., Andamans).
Collocalia francica. Blanf. & Oates, iii, p. 178 (part).

Vernacular names. None recorded.

Description. Similar to typical *C. f. francica* but paler as well as larger, more brown and less black above and with the rump even less well defined.

Colours of soft parts as in the other races.

Measurements. Wing 115 to 121 mm.; tail 49 to 53 mm.; tarsus about 9 mm.; culmen about 4 to 5 mm.

Distribution. South Andaman Islands, Nicobars, Pulo Tioman and coasts of the southern part of the Malay States. Once accidental in Tenasserim, the specimen thus occurring being very typical.

Nidification. Osmaston found this Swiftlet breeding round the coasts of the Andaman Islands during March and early April, the colonies numbering from 25 to 40 pairs. The nests he describes as "of pure white semi-translucent inspissated saliva, half-cups stuck up against the sloping roofs of small caves round the coast." Forty-eight eggs average 20·2 × 13·5 mm.: maxima 21·3 × 13·5 and 20·9 × 14·0 mm.; minima 18·5 × 13·1 and 19·7 × 13·0 mm.

Habits. A purely coastal form but otherwise typical of the genus.

(1613) Collocalia francica germani.

OUSTALET'S GREY-RUMPED SWIFTLET.

Collocalia germani Oust., Bull. Soc. Philom. Paris, p. i (1876) (Condore Is.).
Collocalia francica. Blanf. & Oates, iii, p. 178 (part).

Vernacular names. *Zee-wa-so* (Burmese).

Description. Differs from the preceding form in being slightly paler and browner above, definitely paler and greyer below and in having a broad well-defined band of grey on the rump, the black shafts of the feathers showing up boldly.

Colours of soft parts. Iris brown; bill black; legs brown.

Measurements. Wing 118 to 122 mm.; other measurements as in the preceding bird.

Distribution. Mergui Archipelago, North Malay Peninsula and South-West Siam; Condore Island, Cochin China and Philippines.

Nidification. Similar to that of the other races, breeding during April and May and perhaps earlier on the islands and coast of Tenasserim and Malay Peninsula. The only four eggs I have seen were taken by Messrs. J. P. Cook and J. M. D. Mackenzie and measure 19·0 × 14·2, 19·3 × 14·2, 21·0 × 14·0 and 22·1 × 14·0 mm. The nest sent me is just a mass of feathers glued together with saliva, but this is not typical and the first nests made are said to contain nothing but saliva.

Habits. Those of the species.

Collocalia linchi.

Collocalia linchi Horsf. & Moore, Cat. B. Mus. E.I. Co., i, p. 100 (1854).

Type-locality: Java.

The typical form is larger than either of those found within our limits; wing over 103 instead of under 101 mm.

Key to Subspecies.

A. Upper surface more blue, less green .... *C. l. affinis*, p. 352.
B. Upper surface less green, with very little blue tinge ..... *C. l. elachyptera*, p. 353.

(1614) Collocalia linchi affinis.

Beavan's Swiftlet.

Collocalia affinis Beavan, Ibis, 1867, p. 318 (Port Blair).
Collocalia linchi. Blanf. & Oates, iii, p. 178 (part).

Vernacular names. None recorded.

Description. Whole upper surface black glossed with deep blue or slightly greenish-blue; in birds in poor condition the brown bases of the feathers show through on the nape and neck; chin, throat, sides of the head and neck brownish-grey; those on the breast and lower parts the same but with broad white edges, getting broader and broader on the abdomen which is almost all white; under tail-coverts black glossed with blue and the shorter edged with white.

Colours of soft parts. Iris deep brown; bill and feet black; tarsus naked and tail square.

Measurements. Wing 91 to 100 mm.; tail 36 to 39 mm.; tarsus 8 to 9 mm.; culmen 3·5 to 4 mm.

Distribution. Andamans and Nicobars.

Nidification. Beavan's Swiftlets breed in great numbers all round the Andaman and Nicobar coast from December until late in May, building their nests not only in caves but in other places also, for Osmaston found a large colony in the Chatham Saw-mills, their nests placed under the wooden roof about thirty feet up. The nests were for the most part in thick clusters but a few were also scattered about singly or in twos and threes. He describes the nests as made "of Casuarina leaves, seaweed and human hair, consolidated and matted together with saliva." This human hair, a remarkable item, he found used in the majority of nests, probably obtained from the place where the convicts had their hair clipped. Sometimes, however, the nests are almost purely saliva and I have two such with just one or two tiny fragments looking like moss incorporated.

One hundred eggs average 17·5×11·2 mm.: maxima **18·7**× 11·2 and 17·2×**12·0** mm.; minima **17·0**×11·0 and 18·0×**10·3** mm.

Habits. Those of the species.

(1615) Collocalia linchi elachyptera.

OBERHOLSER'S SWIFTLET.

Collocalia linchi elachyptera Oberholser, Proc. Acad. Nat. Sci. Phil., U.S.A., 1906, p. 207 (Bentinck Is.).
Collocalia linchi. Blanf. & Oates, iii, p. 178 (part).

Vernacular names. None recorded.

Description. Exactly like Beavan's Swiftlet but with a much greener gloss on the upper parts.

Colours of soft parts. Iris dark brown; bill black; legs and feet dark fleshy-brown.

Measurements. Wing 97 to 105 mm.; tail 38 to 41 mm.; tarsus about 8·5 mm.; culmen about 3·5 to 4 mm.

Distribution. Islands of the Mergui Peninsula. Birds from Johore, Malacca and Singapore agree better with Oberholser's bird than with typical *linchi* from Java, Sumatra and Borneo, and I should place them with the Mergui race.

Nidification. Nothing recorded.

Habits. Those of the species.

Subfamily HEMIPROCNINÆ.

This Subfamily contains a single genus of very remarkable Swifts, which differs from all others in the characters of their tarsi and feet, which show strong affinities to the *Hirundinidæ* among the Passeres.

In these Crested Swifts the *flexor longus hallucis* gives off a slip to the hallux which is not supplied by the *flexor perforans digitorum*. It then goes on to blend with a branch of that tendon which supplies the fourth digit.

The hind toe is not reversible.

The posterior portion of the sternum has two foramina, one on either side.

Genus HEMIPROCNE.

Hemiprocne Nitzsch, Observ. Av. Arter. Carot. Com., p. 15 (1829).

Type, *Hirundo longipennis* Rafinesque.

The genus *Hemiprocne* contains the Crested Swifts, a very beautiful group of birds in which the sincipital plumes are long and erectile, whilst in some species there are also long superciliary or moustachial tufts. The tail is long and forked; the wings

when folded reach to the end of the tail or just beyond; the sexes differ in plumage and the young are unlike the adult; there is a patch of silky downy feathers on each flank.

Key to Species.

A. Crest long; no superciliary or moustachial tufts.
  a. Back bluish-grey ..... *H. coronata*, p. 354.
  b. Back greenish bronze..... *H. longipennis*, p. 356.
B. Crest small; white superciliary and moustachial tufts ..... *H. comata*, p. 357.

(1616) Hemiprocne coronata.

The Indian Crested Swift.

Hirundo coronata Tickell, J. A. S. B., ii, p. 580 (1883) (Borabhum, Bengal).
Macropteryx coronata. Blanf. & Oates, iii, p. 180.

Vernacular names. *Dao-hadi-ko* (Cachari).

Fig. 60.—Head of *H. coronata*. $\frac{1}{1}$.

Description.—Male. Lores and below the eye black; ear-coverts, sides of face, chin and sides of throat chestnut; a faint trace of a pale supercilium above the lores and eye; upper parts bluish-ashy; crest darker and glossed with green; wing-coverts dark grey glossed with green or bluish-green; quills and tail-feathers dark brown glossed with greenish; centre of throat, the breast and flanks pale bluish-grey, passing into white on the abdomen and under tail-coverts.

Colours of soft parts. Iris dark brown, the eyelids plumbeous; bill black; legs and feet fleshy to fleshy-brown.

Measurements. Wing 151 to 165 mm.; tail 117 to 135 mm.; tarsus about 7 to 8 mm.; culmen about 7 mm.

Female has the chin, face and sides of the head and throat grey, the black lores shading into dark grey on the ear-coverts, which are divided from the lower sides of the head by a narrow white line.

Young birds have the feathers of the upper plumage finely edged with pure white with broad subterminal bands of pale brownish-grey; the scapulars and innermost secondaries have the ends broadly grey-white with very fine subterminal lines of brown; below, the feathers are edged white and sub-edged blackish.

Distribution. Ceylon, the greater part of India, omitting Sind, Punjab, and the drier, less well-wooded parts of Rajputana, the Deccan, Carnatic and Central India. It extends to the sub-Himalayas from Dehra Dun to E. Assam and occurs throughout Burma in suitable places as far South as Tenasserim and also in the Southern Shan States and Siam.

Nidification. This beautiful Swift breeds during March, April and early May wherever it is found except in Ceylon, where it lays in February and March. The nest is an extraordinarily tiny pocket measuring from $1\frac{1}{2} \times 1$ inch to 2 inches either way, made of fragments of bark, a few of the smallest feathers obtainable and saliva, the whole compressed into a fabric measuring less than a millimetre at the thinnest part and nowhere over two or three mm. thick. The colour, as a whole, is black with small grey or dirty white blotches, agreeing exactly with the side of the branch to which it is fastened so that from below it appears to be just an ordinary knot in the branch and, as a nest, is impossible of detection. Occasionally the nest is placed at great heights from the ground but, more often, somewhere between twelve and twenty-five feet on small trees growing in scrub-jungle. The hen bird sits very close and it is only by watching her constant return to one of these apparent knots in the tree that the nest can be detected. Only one egg is laid, which just fills the nest, and the hen sits across the branch, covering the egg with the hinder portion of her abdomen. The branch selected is generally from 10 to 25 mm. in diameter.

Twenty-five eggs average $23{\cdot}7 \times 17{\cdot}1$ mm.: maxima **25·0 × 18·0** mm.; minimum **22·3×16·7** mm. In colour they are not pure white, but pale grey, sometimes with a faint bluish tinge and in shape they are broad elliptical ovals.

Habits. The Crested Swift is a bird of forests and well-wooded countries, where it is found in small parties of a dozen or two, hawking for flies, midges, etc. in a wheeling flight, much more like that of a swallow than a swift and not nearly so powerful as that of the Common Swift. Moreover, it constantly perches on trees, sitting upright and holding its crest erect whilst doing so. Its loud screaming cry, which has been likened to that of a parrot, is uttered both on the wing and when perching and it is especially noisy in the evenings when retiring to roost. At night the flock sometimes, as I have seen, sits all huddled up close together, but at other times it has been recorded as roosting singly.

Hemiprocne longipennis.

Hirundo longipennis Rafinesque, Bull. Soc. Phil. Paris, iii, p. 153 (1803).

Type-locality : Java.

The Javan bird differs from that found in Borneo and Sumatra Northwards in having rather more white on the underparts, slightly paler rump and more white on the innermost secondaries.

(1617) Hemiprocne longipennis harterti.

THE MALAYAN CRESTED SWIFT.

Hemiprocne longipennis harterti Stresemann, Nov. Zool., xx, p. 339 (1913) (N.E. Sumatra).
Macropteryx longipennis. Blanf. & Oates, iii, p. 181.

Vernacular names. None recorded.

Description.—Male. Ear-coverts deep chestnut; lores deep black; upper part of head, neck, back, wing-coverts, upper tail-coverts and tail glossy bronze-green; lower back and rump bluish-ashy; quills black, the innermost secondaries almost wholly grey or whitish-grey; sides of the head, chin, throat and breast dark bluish-grey, grading into pure white on the centre of the abdomen and under tail-coverts; flanks grey, sometimes marked with white.

Colours of soft parts. Iris dark brown; bill black; legs and feet dull purple (*Kelham*) to black (*Graydon*).

Measurements. Wing 155 to 169 mm.; tail 94 to 102 mm.; tarsus 7 to 8 mm.; culmen about 7 mm.

Female. Similar to the male but with ear-coverts concolorous with the crown.

Young birds have the upper parts blackish-brown, narrowly barred with white; the crest is black tipped with rufous; the wing-coverts are tipped with white or rufous and the innermost secondaries nearly all white with narrow brown subterminal bars; below, the plumage is white suffused with rufous-brown on the chin, throat and breast, barred everywhere with black subterminally; edged on throat, fore-neck and upper breast with pure white.

Distribution. Borneo, Sumatra and the whole of the Malay Peninsula, North to Tenasserim and South-West Siam.

Nidification. Similar to that of the other species. The only nest and egg I have seen were taken by Major Moulton near Sarawak on the 25th of February. The nest was on a small tree, attached to a branch about twenty-five feet from the ground. The egg measures 23·2×17·2 mm., and when taken was a distinct blue-grey but has now much faded. A series of eggs of the typical form from Java measure on an average 24·1 × 19·8 mm.

Habits. Those of the genus.

(1618) Hemiprocne comata comata.

THE TUFTED TREE-SWIFT.

Cypselus comatus Temm., Pl. Col., 268 (1824) (Sumatra).
Macropteryx comata. Blanf. & Oates, iii, p. 182.

Vernacular names. None recorded.

Description.—Male. Lores black; crown, nape, throat and sides of head behind the ear-coverts deep, glossy purplish-blue; narrow frontal line and long supercilium pure white, the posterior feathers long and narrow; ear-coverts rufous; chin white; a second long white line from the lower bill, running back under the ear-coverts with lengthened posterior feathers like the supercilium; back, rump, upper tail-coverts, breast, flanks and abdomen bronze-brown; upper and under wing-coverts deep metallic blue; quills black edged with metallic blue; innermost secondaries mostly white; vent and under tail-coverts white.

Colours of soft parts. Iris dark brown; bill black; legs and feet purplish-pink (*Davison*).

Measurements. Wing 121 to 130 mm.; tail 70 to 78 mm.; tarsus about 7 to 8 mm.; culmen 5 to 6 mm.

Female has the ear-coverts the same colour as the crown.

Distribution. The extreme South of Tenasserim, from Choungthanaing 90 miles South of Mergui, through the Malay Peninsula to Sumatra, Java, Borneo, the Natunas, Sibutu and Sulu Islands. The Philippines bird has been separated as *H. c. major* by Hartert on account of its larger size.

Nidification. The only nest and egg I have seen of this Swift was taken by Kellow near Simpang, in the Federated Malay States, on the 26th of February. The nest is a tiny slab, rather than saucer, of inspissated saliva, with one tiny scrap of moss. It measures 43 mm. where attached to the branch and 28 mm. across the other way. It seems incredible that the egg could have been kept in the nest, the more so in that it was forty feet up or more in a tall tree standing in the open, though well-wooded country. The egg measures 25·0×15·0 mm.

Habits. Those of the genus.

Suborder CAPRIMULGI.

The Nightjars are genetically related to the *Striges* or Owls, which they resemble very closely in some characters, both external and anatomical. In other ways they would appear to have links with the Trogans. Among the characters which the *Caprimulgi* and *Striges* have in common are the following: an entire absence of down in the adult; a nude oil-gland; the absence of the ambiens and accessory caudal and, in addition, the semitendinosus muscles; the schizognathous skull and the possession of basipterygoid processes.

In the *Caprimulgi* the feet are syndactylous and the claw of the inner toe is serrated or pectinated; the deep plantar tendons have the *Flexor perforans digitorum* and *Flexor longus hallucis* fused, as in the *Bucerotidæ* and *Cypselidæ*; the outer toe has four phalanges except in the genus *Ægotheles* which has five, but which also has no serrations on the inner toe; cæca are present and functional; the aftershaft to the feathers is very small.

Family CAPRIMULGIDÆ.

In this family the bill is short, weak, flexible and with an enormous gape; nostrils tubular; the wings are long, the second quill generally longest.

The family is represented throughout all tropical and temperate regions.

Fig. 61.—Left foot of *C. asiaticus*.

Key to Genera.

A. No ear-tufts; strong rictal bristles present.. CAPRIMULGUS, p. 359.

B. Well developed erect ear-tufts; no rictal bristles ..... LYNCORNIS, p. 373.

Genus CAPRIMULGUS.

Caprimulgus Linn., Syst. Nat., 10th ed., i, p. 193 (1758).

Type, *Caprimulgus europæus* Linn.

In this genus the wing is long and pointed, the second primary longest, the first and third slightly shorter; the tail is long with the feathers graduated; the rictal bristles are strong and numerous and generally white at the base; the sexes are alike except that in some species the white patches on the wings and tail in the male are buff or rufous in the female. The tarsus is feathered in some, naked in other species.

Key to Species.

A. Greater part or whole of tarsus feathered; back with black streaks and spots.
  a. Two outer pairs of tail-feathers tipped white in male.
    a'. A white spot on first three primaries in ♂; tarsi three-quarters feathered.. *C. europæus*, p. 359.
    b'. A white spot on first four primaries in ♂; tarsi feathered all over ..... *C. macrourus*, p. 361.
  b. Four outer pairs of tail-feathers with subterminal white spots in male ..... *C. indicus*, p. 366.
B. Tarsus almost naked.
  c. No distinct black streaks on back.
    c'. Outer tail-feathers tipped white in male, buff in female ..... *C. mahrattensis*, p. 369.
    d'. Outer tail-feathers all white except at tip in male, mottled throughout in female ..... *C. monticolus*, p. 370.
  d. Distinct but narrow black streaks on back. *C. asiaticus*, p. 372.

Caprimulgus europæus.

Caprimulgus europæus Linn., Syst. Nat., 10th ed., i, p. 193 (1758).

Type-locality: Sweden.

The typical form of this Nightjar differs from our Indian race in being decidedly larger, darker and more brown, less grey.

(1619) Caprimulgus europæus unwini.

HUME'S NIGHTJAR.

Caprimulgus unwini Hume, Ibis, 1871, p. 406 (Hazara).
Caprimulgus europæus. Blanf. & Oates, iii, p. 187.

Vernacular names. *Chippak*, *Chappa* (Hind.).

Description.—Male. Upper plumage grey tinged with fulvous-brown; crown with black streaks, bold and broad in the centre where they form one or two definite lines, sparse elsewhere;

narrow shaft-streaks on back and rump; scapulars with broad black streaks edged with buff; tail-feathers grey with a considerable amount of buff on the basal portions, ill-defined wavy bars of black and with broken black marks in between the bars; two outermost pairs of feathers with broad white tips; wing-coverts with large terminal spots of creamy or buffy white; primaries brown notched with rufous on both webs, the first with a broad bar of white on the middle of the inner web extending to both webs on the second and third; inner primaries and secondaries grey marked with black on the exposed parts and with broken rufous and black bars on the concealed parts; a broad white patch on the throat; remainder of chin and throat and the breast grey vermiculated with dark brown; posterior flanks, abdomen and vent buff barred with dark brown; under tail-coverts buff with similar but fewer bars of brown.

Colours of soft parts. Iris deep brown to black; bill black; legs and feet dark fleshy-red to reddish-brown.

Measurements. Wing 172 to 190 mm.; tail 125 to 144 mm.; tarsus about 16 to 17 mm.; culmen about 9 to 10 mm.

Female. Similar to the male, but with no white on the tail and having the white wing-bar replaced by buff, sometimes showing a little white in the centre, sometimes profusely marked with dark brown.

Young like the female but still more dull.

Nestling covered with down, dark grey above, rather paler below.

Distribution. Persia, Afghanistan, Turkestan to the Amur-Darya, Sind, Kashmir, Punjab, and North-West Provinces.

Nidification. This Nightjar breeds throughout its range; from Baluchistan and Kashmir to Garhwal during May, June and July; in Afghanistan in March and April, Barnes recording a young bird ready to fly in May. The eggs are laid on the ground with no pretence of a nest, but generally in jungle where there is considerable debris of leaves, etc. Ludlow found it breeding on the Pabb Hills at an elevation of about 1000 feet, and it certainly breeds as high as 9,000 feet in parts of Kashmir. The eggs number two only, as with all true Nightjars, and are white in ground-colour, blotched, speckled and smudged with various shades of grey, brown or blackish. Although some are pale, many are well-marked and spotted with black, a character seldom seen in the eggs of the European bird. Forty eggs average 29·9×21·2 mm.: maxima **33·1**×23·2 and 31·9×**23·7** mm.; minima **27·6**×21·1 and 29·5×**20·0** mm. In shape they are elliptical with fine close texture and gloss.

Habits. In Winter this Nightjar is found all over Sind and extends throughout the North-West Frontier Provinces and the Punjab. It is found both in well-wooded and forested country and also in the barest stony deserts and hills of Baluchistan and

Afghanistan. In Sind during its autumn migration it is very numerous and Ticehurst remarks that it occurs even in the streets and compounds of Karachi City. It has the usual silent, though swift, flight of the Nightjar family, feeding almost entirely on the wing on all kinds of insects, coleoptera, moths, etc. Its note is said by Bell to be a kind of whirring note and not similar to the "chuck" of the European Nightjar. It perches on trees and posts, etc. frequently, and Butler notes from Sind that most of those he disturbed were perched on roadside *Babul* and other trees.

Caprimulgus macrourus.

Caprimulgus macrourus Horsf., Trans. Linn. Soc., xiii, p. 142 (1821).

Type-locality: Java.

The typical form is smaller and darker than our Indian races, but is very close to *atripennis* from Ceylon.

Key to Subspecies.

A. Smaller; wing under 200 mm. (except *bimaculatus*).	
a. Black marks on crown confined to centre.	
a'. Upper surface darker.	
a''. White spots on primaries larger, that on second quill generally forming a complete band	*C. m. macrourus.*
b''. White spots on primaries smaller, that on second quill interrupted in the middle	*C. m. atripennis*, p. 361.
b'. Upper surface lighter	*C. m. bimaculatus*, p. 363.
b. Black marks on crown not confined to the centre	*C. m. andamanicus*, p. 363.
B. Larger; wing over 200 mm.	
c. Upper surface paler.	
c'. Lower surface paler, less profusely barred	*C. m. albonotus*, p. 364.
d'. Lower surface darker, more profusely barred	*C. m. nipalensis*, p. 365.

(1620) Caprimulgus macrourus atripennis.

JERDON'S LONG-TAILED NIGHTJAR.

Caprimulgus atripennis Jerdon, Ill. Ind. Orn., pl. 24 (1847) (E. Ghats, South India).

Caprimulgus macrurus. Blanf. & Oates, iii, p. 188 (part).

Vernacular names. *As kappri gadu* (Tel.); *Bimbara*, *Rabara*, *Omerelliya* (Cing.); *Pathekai*, *Pay-marretai* (Tam. in Ceylon).

Description.—Male. Upper plumage very finely vermiculated brown and buff, giving a general tone of brown or buffish-brown varying greatly in degree; crown with broad black streak

numerous in the centre, sparse elsewhere; a few black shaft-lines on the back and generally an indistinct more rufous hind collar; scapulars with large spots of velvety black with rufous-buff bars and edges, one or two of the innermost white-edged; wing-coverts vermiculated grey, black and rufous, some with broader black centres and pale whitish-buff tips; tail mottled dark brown and buff; two outermost pairs with broad white tips, generally edged with buff, and with broad bands of blackish next the white; primaries blackish, the first and sometimes the second notched exteriorly with rufous and with a broad band of white on the inner web of the first on both webs, broken in the middle on the second, and across the whole webs of the third and fourth except the shafts; throat-patch white, the feathers tipped with velvety black and rufous; a white moustachial streak; chin, sides of throat and upper breast mottled brown and buff or rufous-buff; remainder of lower parts buff barred narrowly with blackish, the dark bars widest apart posteriorly.

Colours of soft parts. Iris dark brown to almost black; bill pinkish-brown, the gape and base paler; legs and feet fleshy-brown to brown.

Measurements. Wing 168 to 179 mm.; tail 125 to 132 mm.; tarsus about 16 to 17 mm.; culmen about 10 to 11 mm.

Female. Like the male but with small pale tips more tinged with buff to the outer tail-feathers and with no white spots on the primaries, these being replaced by rufous-buff.

Young birds are like the females but with the primaries much more barred with rufous, the notches and bars almost entirely disappearing in old birds.

Distribution. Ceylon, Travancore and the Malabar coast to the Wynaad, Nilgiris, Palnis and the Bombay Presidency to Kanara and Bombay; the Godavery Valley.

Nidification. This Nightjar breeds from March to August, laying two, sometimes only one, egg. They are, of course, laid on the ground, either on the bare earth or on leaves which have collected, in scrub, bamboo or fairly light jungle. In Ceylon Phillips took several eggs in the scrub-jungle round about villages. The eggs differ from all those of the other races in being boldly marked with deep black-brown blotches and spots on a cream or salmon ground. The smears, irregular pale blotches, found on the eggs of other races of *macrourus* are all absent or nearly so. The very striking difference in these eggs long led me to believe in the specific difference of *atripennis* but I can find no character by which to separate it. Twenty-five eggs average 30·1 × 22·2 mm.: maxima 31·3 × 23·5 mm.; minima 29·0 × 22·0 and 31·1 × 21·1 mm.

Habits. Those of the species. Both Bell and Davidson say that the call of this bird is very distinctive; the latter describes it as "a funny call of four notes which I cannot imitate but which is utterly unlike the other Nightjar calls." Butler says (Bombay

Jour. Nat. Hist., xii, p. 422) it is "a low liquid chuckle of three or four notes."

(1621) Caprimulgus macrourus bimaculatus.

THE BURMESE LONG-TAILED NIGHTJAR.

Caprimulgus bimaculatus Peale, U.S. Explor. Exped., viii, p. 170 (1848) (Malacca).
Caprimulgus macrurus. Blanf. & Oates, iii, p. 188 (part).

Vernacular names. *Hnet-pyin* (Burmese).

Description. Differs from *C. m. atripennis* in being much larger and much paler, the bars on the lower parts wider above, making the abdomen appear more fulvous, less brown.

Colours of soft parts. Iris brown to black; bill black at the tip, pinkish-brown on the base, commissure and gape; legs and feet pinkish-brown to brown.

Measurements. Wing 195 to 223 mm.; tail 168 to 181 mm.; tarsus about 19 to 20 mm.; culmen about 9 to 10 mm.

Distribution. Malay Peninsula, North to Burma; East to Yunnan, Siam, Cambodia and Cochin China.

Nidification. This Nightjar breeds principally in March and early April, a few birds laying in May. Hopwood obtained a fine series of eggs from North Arakan to Tavoy in March and Herbert took eggs in February in Siam. The eggs are generally deposited in jungle, either scrub or bamboo, occasionally in thin deciduous forest. Fifty eggs average 31·3 × 22·6 mm.: maxima **34·0** × 22·4 and 32·2 × **24·0** mm.; minima **28·0** × 22·0 and 33·0 × **21·2** mm. In colour they vary from pale to deep salmon, less often a creamy yellow; indistinctly blotched with pale reddish-brown and with secondary marks of neutral tint or pinkish lavender. The blotches are generally fairly numerous everywhere, sometimes sparse and often very faint and smudgy.

Habits. Those of the species.

(1622) Caprimulgus macrourus andamanicus.

THE ANDAMAN LONG-TAILED NIGHTJAR.

Caprimulgus andamanicus Hume, Str. Feath., i, p. 470 (1873) (Andamans); Blanf. & Oates, iii. p. 190.

Vernacular names. None recorded.

Description. Very close in general appearance to *C. m. atripennis*, but with the longitudinal black marks on the crown more widely scattered and not confined to the centre. In most specimens the pale markings on the wings are more rufous and not so pale.

Colours of soft parts as in *C. m. atripennis*.

Measurements. Wing 172 to 186 mm.; tail 125 to 130 mm.; tarsus 16 to 17 mm.; culmen about 10 to 11 mm.

Distribution. Andamans only.

Nidification. Breeds during the end of February, March and early April in thin open forest, depositing its two eggs on the fallen teak leaves and other rubbish. The eggs only vary from those of the other races in being very richly coloured and they are, when fresh, the most beautiful of eggs, but they fade quickly and become more yellow and less deep salmon. Twenty-two eggs average 28·8×21·9 mm.: maxima **31·8**×20·6 and 29·0×**22·2** mm.; minima **27·3**×21·6 and 31·8×**20·6** mm.

Habits. This is a very common bird in the Andamans, keeping to the thinner, more open forest and to the fringes of cultivation, often hawking quite in the open when the evening falls.

(1623) Caprimulgus macrourus albonotus.

THE INDIAN LONG-TAILED NIGHTJAR.

Caprimulgus albonotus Tickell, J. A. S. B., ii, p. 580 (1833) (Dhalbhum, Bengal).
Caprimulgus macrurus. Blanf. & Oates, iii, p. 188 (part).

Vernacular names. *Ita-kholi* (Assam); *Dao-chuck* (Cachari).

Description. This race is easily separable from the three preceding forms as well as from *C. m. macrourus* by its much paler, brighter coloration; the white tips to the tail-feathers are very wide and, in old birds, very pure; the under surface is more fulvous owing to the dark bars being narrower and wider apart, the white wing-patch is larger, especially on the first primary and is seldom divided on the second primary. It is also much larger than all but *bimaculatus*.

Colours of soft parts. Iris brown; bill dark brown at the tip, fleshy-brown to reddish on base, commissure and gape; legs and feet reddish- to purplish-brown, the soles pinky-flesh colour.

Measurements. Wing 205 to 235 mm.; tail 165 to 179 mm.; tarsus about 19 to 20 mm.; culmen about 9 to 10 mm.

Distribution. North-West India, North to the North-Western Provinces, Kumaun, Simla States and Garhwal; East to Bihar, Calcutta and Orissa, South to Northern Bombay Presidency, Central Provinces and Orissa. Birds from Southern Assam seem to be referable to this rather than to the next race which occurs in the North of the Brahmaputra.

Nidification. This fine Nightjar breeds during March, April and May from the plains and foot-hills up to some 7,000 or 8,000 feet, but most commonly below 5,000 feet. The eggs only differ from those of the other races in being larger; the darkest coloured eggs are redder and less salmon-coloured than are those of *andamanicus*, whilst the palest are yellowish-cream in ground-colour.

Fifty eggs average 32·2×23·0 mm.: maxima **34·5**×24·3 and 34·4×**25·3** mm.; minima **29·0**×22·0 and 31·6×**21·2** mm. The eggs are deposited in thin forest, scrub-jungle or in open stony ravines.

Habits. Those of the species. This is an exceptionally confiding, tame bird and all my specimens, required as skins, were caught in a butterfly-net. The net, similar in colour to the earth, was laid upon it with a large moth or beetle placed in the centre, the bird settled on this and was then picked up in the net by the man at the other end, six feet away. Whilst watching them in and near my garden in North Cachar they often settled within a foot or two of my feet. I noticed they fed much upon the ground and ran well for a few feet at a time. Twice I noticed a female accept the attentions of two males one after the other, a very unusual proceeding among birds. The beetles these birds will seize and devour are very large and I have taken great staghorn-beetles from their stomachs which would have measured nearly three inches if unbroken. Their call is a monotonous "chuck, chuck, chuck," repeated five, seven or nine times, very seldom an even number and when it is the Hill Tribes consider it very unlucky and an omen of death. Thirteen "chucks," on the other hand, is very lucky. Sometimes the final single notes end with a rolling "chur-r-r-r." Like most Nightjars they often perch on trees and during the breeding-season their favourite perch is an old stump, a garden post or something similar.

The young when first hatched still blind and covered with yellow down hide themselves instinctively at the sound of a footstep, flattening themselves out among the leaves so that they are only discovered with the greatest difficulty. If, however, one moves away backwards they will be seen to move and hide under some convenient leaf.

(1624) Caprimulgus macrourus nipalensis.

THE NEPAL LONG-TAILED NIGHTJAR.

Caprimulgus nipalensis Hartert, Cat. B. M., xvi, p. 541 (1892) (Nepal).
Caprimulgus macrurus. Blanf. & Oates, iii, p. 188 (part).

Vernacular names. *Ita-kholi* (Assam).

Description. Very similar to the Indian Long-tailed Nightjar but on the whole darker both above and below, the tail especially shows this; the dark bars on the underparts are broader and closer together, but the fulvous parts are very much the same.

Hartert's name was founded on specimens from Nepal, mostly Hodgson's, whose specimens are notoriously dull and faded, but more recently acquired specimens are quite as fulvous below as most individuals of the *albonotus* race.

Colours of soft parts as in the preceding race.

Measurements. Wing 205 to 223 mm.; tail 155 to 176 mm.; tarsus 19 to 20 mm.; culmen 9 to 10 mm.

Distribution. Nepal, Sikkim and the hills of Northern Assam, North of the Brahmaputra, East to the Miri and Abor Hills.

Nidification. Similar to that of the preceding bird. Stevens says that in Sikkim this is not a bird of high elevations but breeds up to nearly 4,000 feet in the Tista Valley. Twelve eggs average 31·5×22·7 mm.: maxima **35·0×23·4** mm.; minima **27·4** ×**22·0** mm. They breed during April and May; both in the plains and foot-hills and in the higher hills.

Habits. Those of the species.

Caprimulgus indicus.

Key to Subspecies.

A. General colour not so dark; less grey, more rufous ..... *C. i. indicus*, p. 366.
B. General colour very dark; more grey, less rufous.
a. Larger, wing over 187 mm. ..... *C. i. jotaka*, p. 367.
b. Smaller, wing under 187 mm. ..... *C. i. kelaarti*, p. 368

(1625) Caprimulgus indicus indicus.

The Indian Jungle Nightjar.

Caprimulgus indicus Lath., Ind. Orn. ii, p. 588 (1790) (India); Blanf. & Oates, iii, p. 190 (part).

Vernacular names. *Chippak*, *Chappa*, *Dab-churi*, *Dabnak*, *Andha chiriya* (Hind.).

Description.—Male. Upper part of head and neck pale grey-brown, vermiculated with tiny wavy bars of darker brown, the crown marked profusely with large longitudinal marks of black, distributed over the greater part of the crown but often tending to form a median line; upper back browner and darker; rump and upper tail-coverts like the head; central tail-feathers vermiculated grey and dark brown and with narrow broken bars of black; outer four pairs of tail-feathers sub-tipped with white, each pair outwards showing less and less of the grey and brown vermiculations; scapulars vermiculated grey and brown with bold black markings and buff spots more or less broken by brown; wing-coverts the same; primaries brownish-black, the first with a white patch on the inner web, the next three with the white on both webs, the bases notched and barred with rufous; outer secondaries banded rufous and blackish with mottled tips, the latter increasing in extent until the innermost are all mottled; a white patch on the throat and a white moustachial streak, both often much mixed with rufous; chin and breast with dark bars of brown and buff, the buff increasing and the brown decreasing towards the under tail-coverts which are buff with a few narrow bars of blackish.

The range of variation in tone is considerable, some birds are greyer, others are more rufous, some are darker and some paler.

Colours of soft parts. Iris deep brown; bill pinkish-brown, vinous brown or deep fleshy colour, the tip almost black and the base and gape still paler; legs and feet fleshy to vinous brown, the soles paler.

Measurements. Wing 172 to 198 mm.; tail 125 to 145 mm.; tarsus about 15 to 16 mm.; culmen about 10 to 11 mm.

Female. Similar to the male, the tail-feathers without white tips and mottled throughout; there are no white spots on the primaries, though these are more or less indicated by smaller rufous spots or patches.

Distribution. Practically the whole of India South of the Himalayas in suitably forested country. In the South of Travancore *C. i. kelaarti* appears to be the prevailing form.

Nidification. The Jungle Nightjar breeds during March, April and May over its whole range, but Kinloch took eggs in the Nelliampathy Hills in February and Primrose took two eggs in the Nilgiris on the 14th of the same month. The eggs are laid on the ground, sometimes in open country but more often in forest and scrub-jungle. In appearance they are hardly distinguishable from those of *Caprimulgus macrourus* but they average smaller than those of any race of that bird. Thirty-two eggs average 30·4 × 21·8 mm.: maxima **33·6** × 22·3 and 33·0 × **24·0** mm.; minima **28·3** × 21·3 and 28·5 × **20·1** mm. Most of the notes on *Caprimulgus kelaarti* in Hume's 'Nests and Eggs' refer to this race. The ground-colour varies from pale salmon-pink or reddish to a warm salmon or buffy-red, rarely almost brick-red, with blotches, smears and spots of reddish-brown and others underlying them of neutral tint and lavender.

Habits. This Nightjar is a bird both of jungle, forest and open country so long as the latter is well wooded. On the Nilgiris and hills of Southern India it is found alike in the open country and in the tree-forest filling the valleys. Its note is like that of a stone scudding across ice: *chuck*, *chuck*, *chuck*, getting faster and faster and ending in a *chir-r-r-r*. It calls more in late mornings, after the sun has risen, than do most Nightjars and starts again earlier in the evenings.

(1626) Caprimulgus indicus jotaka.

THE JAPANESE JUNGLE NIGHTJAR.

Caprimulgus jotaka Temm. & Schl., Faun. Jap., p. 37 (1847) (Japan).
Caprimulgus indicus. Blanf. & Oates, iii, p. 190 (part).

Vernacular names. *Orngel-pyin*, *Mye-wut* (Burmese); *Tamor* (Lepcha); *Wapatshai* (Naga); *Dao-chuck* (Cachari).

Description. Similar to *C. i. indicus* but larger and darker, more grey.

Colours of soft parts as in the preceding bird.

Measurements. Wing 189 to 208 mm. (one 187 mm.).

Distribution. From the Amur to Japan, China, the Indo-Chinese countries, Burma to the South of the Malay Peninsula; Java, Borneo and New Guinea; in India it extends throughout the sub-Himalayas from Assam to Kuman.

Nidification. This is the most common Nightjar in the Hills of Assam and the North-East of India, breeding, as it does in Siberia and Japan, in May, June and July or, less often, in April. I have taken eggs in some small clearing in dense evergreen forest, in open places beside streams and rivers, in bamboo and in scrub jungle and also on bare stony places quite unsheltered and open. Occasionally they lay in grass-land under a tuft of grass or small bush and often in stony ravines running through forest. The eggs are remarkable, for they are of the white European Nightjar type and not of the red *indicus* coloration. Nor do these eggs ever show any approximation to the latter and judging by the eggs alone one would think it impossible for the birds to be races of the same species. The ground-colour of the eggs is white and they are marbled with greyish-brown and dark grey. Some eggs are more spotted than marbled and in such the spots are sometimes much darker, almost black. One hundred Indian eggs average 30·7 × 22·7 mm.: maxima **33·1** × 23·1 and 31·5 × **23·5** mm.; minima **27·2** × **20·3** mm. Japanese and Siberian eggs average much larger though there is little difference, if any, in the size of the birds. The female alone incubates by day, the male relieving her in the mornings and evenings and generally squatting beside her during the daytime.

Habits. Similar to those of the preceding bird. In Assam we found it to be quite as tame as *Caprimulgus m. albonotus* and I caught many specimens in butterfly-nets.

(1627) Caprimulgus indicus kelaarti.

THE CEYLON JUNGLE NIGHTJAR.

Caprimulgus kelaarti Blyth, J. A. S. B., xx, p. 175 (1851) (Ceylon).
Caprimulgus indicus. Blanf. & Oates, iii, p. 190 (part).

Vernacular names. *Bin-bassā* (Cing.); *Pathekai-kuruvi* (Tam.).

Description. Smaller than *C. i. jotaka*, darker than *C. i. indicus*, less rufous and more grey in ground-colour and general tint.

Colours of soft parts as in the other races.

Measurements. Wing 167 to 184 mm. (one 187, one 188 mm.).

Distribution. Ceylon and the South of Travancore. Birds from North Travancore, Malabar coast and the Wynaad and Nilgiri Hills are somewhat intermediate in colour and size between this form and true *indicus*, but should be retained with the latter.

Nidification. Very little authentic recorded, most notes being

referable to the Indian race. Many eggs sent me said to be of this Nightjar seem to be much too small and are probably those of *C. asiaticus*. Bourdillon, Stewart and Wait, however, have taken properly authenticated eggs during February and March in Travancore and Ceylon. These are just like those of the Indian Jungle Nightjar but are smaller. Ten average 28·1 × 20·7 mm.: maxima 29·9 × 21·6 mm.; minima 26·8 × 20·0 mm. Wait remarks that this Nightjar frequently lays one egg only.

Habits. Those of the species. Butler describes its note as "chuker-chuker."

(1628) Caprimulgus mahrattensis.

SYKES'S NIGHTJAR.

Caprimulgus mahrattenssis Sykes, P. Z. S., 1832, p. 83 (Mahrattas); Blanf. & Oates, iii, p. 184.

Vernacular names. *Chippak*, *Chappa* (Hind.).

Description.—Male. Whole upper plumage, wings and tail sandy-grey, finely vermiculated with wavy bars of light brown; on the head, scapulars and, sometimes, the lower back are a few small arrow-heads of black and on the scapulars a few broader bars of black with spots of pale buff; wing-quills brownish-black, mottled at the tips and with a broad band of white across the centre of the first four; in some the white is obsolete on the outer web of the first and on the fourth primary; tail barred with black and with broad white tips to the outer two pairs; a small white patch on the throat; chin, breast and upper flanks vermiculated fulvous, grey and brown changing to fulvous with narrow bars of black on the abdomen, axillaries and under wing-coverts; vent and under tail-coverts pale fulvous.

Some specimens show a hind collar of fulvous markings, in some this is only indicated and in others quite absent.

Colours of soft parts. Iris dark brown; bill brown, pinkish at the base, commissure and gape; legs and feet pale fleshy-brown with black claws.

Measurements. Wing 157 to 173 mm.; tail 100 to 104 mm.; tarsus about 18 mm.; culmen about 7 to 8 mm.

Female. Similar to the male but with the wing-spots smaller and tinged with fulvous and the tail-spots fulvous and often a little vermiculated with brown.

Distribution. Sind, Afganistan, Baluchistan and North-West India, straggling as far East as Purnea in Western Bengal.

Nidification. Sykes's Nightjar breeds in Sind, Baluchistan and the North-West Frontier from March to June, laying two eggs either on bare, or nearly bare, patches of ground in the cultivated districts or on sandy and stony desert ground with little or no cover beyond a few stunted tamarisk bushes. Rattray took many eggs

on the Afghan frontier laid on absolutely bare stony hillsides and these he says, although sometimes more or less sheltered by rocks, were never under bushes. The eggs are easily distinguishable from all other Indian Nightjars', being white in ground-colour, marbled densely all over with light grey so that practically no ground shows at all. On the other hand, they have no marks which stand out more boldly or richly than the others. Twenty-two eggs average 28·7 × 21·1 mm.: maxima **30·5** × 21·9 and 28·9 × **2·20** mm.; minima **27·4** × 20·4 and 28·1 × **20·3** mm.

Habits. This Nightjar is very common in Sind, extending thence through the drier hotter parts of the North-West, being common as far as Ferozepore where Betham found it breeding freely. It is found in the most sandy and desert country but is more numerous in partly cultivated land. Bell describes its call as "a continuous soft purring note, softer and in a higher key than that of *Turnix pugnax*, while when disturbed it utters a cluck-cluck." Like all Nightjars it is said to sometimes perch on trees.

(1629) Caprimulgus monticolus monticolus.

FRANKLIN'S NIGHTJAR.

Caprimulgus monticolus Franklin, P. Z. S., 1831, p. 116 (Calcutta—Benares).
Caprimulgus monticola. Blanf. & Oates, iii, p. 185.

Vernacular names. *Chippak*, *Chappa*, *Dab-churi*, *Andha-chiriya* (Hind.); *Tamor* (Lepcha); *Mye-wut* (Burmese).

Description.—Male. General colour above brownish-grey, very finely vermiculated with blackish; the crown and nape marked with broad arrow-heads of black and the hind neck with rufous-buff spots forming an indistinct collar, sometimes hardly noticeable; tail-feathers more buff with cross-bars of black and with the two outer pairs white except at the mottled tips; scapulars like the back but with bold fulvous markings and narrow black streaks; wing-coverts and innermost secondaries the same; first four primaries black mottled at the tips and with a broad white band across the centre, often edged with rufous and generally rufous on the outer web of the first; inner primaries and outer secondaries black, mottled at the tips and with bars of rufous and black elsewhere; a white throat-patch often broken in the centre; rest of chin, throat and breast vermiculated black, grey and, to a less extent, fulvous; abdomen and posterior flanks fulvous barred with blackish, grading from the very dark breast to the pure fulvous under tail-coverts.

Colours of soft parts. Iris dark brown; bill pale brown, dark-tipped and pinkish at the gape and base; legs and feet pale fleshy-brown.

Measurements. Wing 183 to 203 mm.; tail 111 to 117 mm.; tarsus 21 mm.; culmen about 8 to 9 mm.

The individual variation in colour in males is very great, but there seem to be three very well-marked geographical races: the Indian and Burmese; the Chinese very much more rufous, dark and richly coloured; the Formosan, *stictinius*, very grey and with but little rufous.

Females. Like the male but nearly always paler in all three races; the white spots on the wings are rufous or rufous-white and the outer tail-feathers are mottled throughout. The general tone of the colour in females varies even more greatly than in the males, some being grey whilst some look almost entirely rufous; in most the vermiculations are finer than in the male and the bolder black and buff markings are often absent.

Distribution. Practically the whole of India, South to Mysore and Travancore, West to the Punjab, East through the United Provinces, Central Provinces, sub-Himalayas, Bihar, Bengal, Assam, the whole of Burma as far South as Moulmein in Tenasserim. Specimens from Annam approach the Formosan grey bird whilst those from the Shan States, Siam and Yunnan are, perhaps, nearer the Chinese richly coloured rufous form.

Nidification. Franklin's Nightjar breeds from March until August, most eggs being laid before the middle of May whilst the later ones are probably second broods. It breeds throughout the plains and in the Himalayas up to 6,000 feet. Jones took eggs in the Bhagat State of the Simla Hills, Primrose took them near Kurseong below Darjeeling at 5,000 feet and in Assam it occurs up to about the same level. The usual two eggs are laid both in the open and in forest, but the favourite situation seems to be thin deciduous forest, scanty mixed bamboo and scrub jungle or thin secondary growth on poor soil. Even when laid in forest those I have personally taken were nearly always in ravines, often rocky and nearly always open and free from any heavy cover. Forty eggs average 30·2 × 22·1 mm.: maxima **33·2** × 22·2 and 31·1 × **23·2** mm.; minima **28·3** × 22·8 and 28·9 × **17·6** mm. They are of the red type, varying from warm salmon to deep salmon-red in general colour, blotched and mottled with reddish-brown and light red, with secondary markings of lavender less numerous than in most Nightjars' eggs. Some eggs are handsomely blotched with bold well-defined marks and one or two clutches have these markings in a ring round the larger end. The texture is more glossy than in the eggs of the other Nightjars.

Habits. Franklin's Nightjar inhabits all kinds of well-wooded country, alike shunning the heaviest forests and the barest deserts. The note is said to closely resemble the call of the Common Indian Nightjar, though to be easily distinguished from it by its more sonorous tone and slower repetition. It also has a single note, not unlike that of an owl's, repeated at considerable intervals. This note has been much disputed, but I shot a specimen seated on a stump in the moonlight uttering this note and do not think there could have been any mistake about it. Davidson, a most

keen observer, considered this to be the usual call-note of Franklin's Nightjar and doubted if it ever uttered the *asiaticus* note. In flight, food, etc. it resembles other Nightjars.

(1630) Caprimulgus asiaticus.

THE COMMON INDIAN NIGHTJAR.

Caprimulgus asiaticus Lath., Ind. Orn., ii, p. 588 (1790) (India, *Bombay*); Blanf. & Oates, iii, p. 186.

Vernacular names as in *C. i. indicus* and *monticolus*.

Description. Upper plumage vermiculated yellowish-grey and pale brown; crown marked with bold, black longitudinal streaks; back and upper tail-coverts with very fine black shaft-lines; a broad collar of buff, each feather edged and barred with blackish;

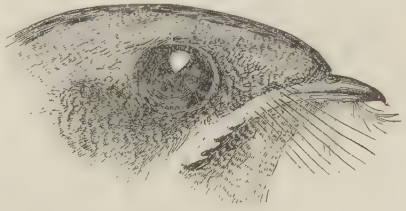

Fig. 62.—Head of *C. asiaticus*. ½.

scapulars with broad black and pale buff patches; feathers of wing-coverts with black bases, mostly concealed, and with large buff spots, rufescent next to the black; first four quills black with mottled tips and a broad white band across the middle, generally absent on the outer web of the first primary or merely represented by a rufous edging; central tail-feathers like the back but with narrow black cross-bars, outer tail-feathers with broad white tips and the bases black barred on the inner webs with rufous, intermediate rectrices nearly all black with interrupted mottled bars of rufous; a white patch on either side of the throat, the feathers tipped pale rufous and black; a well marked moustachial streak white; chin, throat and breast vermiculated pale buff and brown and more or less mottled with buff; lower breast, axillaries, under wing-coverts and abdomen fulvous; vent and under wing-coverts pale buff.

Colours of soft parts. Iris hazel; bill fleshy-pink to fleshy-red, the tip darker and brownish and the culmen darker reddish-brown, narrowly barred with black; legs and feet fleshy or pinkish brown.

Measurements. Wing 141 to 158 mm.; tail 110 to 119 mm.; tarsus about 20 mm.; culmen about 9 to 10 mm.

Distribution. Ceylon, all India North to Sind and the Punjab, East to Eastern Bengal and Assam; all Burma South to Tenasserim.

Nidification. The Common Indian Nightjar breeds over the whole of the plains of India, Burma and Ceylon except the driest most desert portions such as Sind and parts of Rajputana. In Ceylon and Travancore it often lays but one egg but elsewhere lays the usual pair, breeding during most months of the year but perhaps most frequently from February to April and then again in July and August. It prefers open country with a fair amount of bush or cover but sometimes lays quite in the open and at other times in orchards, thin forests or bamboo-jungle. The eggs are small editions of those of *Caprimulgus macrourus* and need no further description. One hundred eggs average 26·5 × 19·9 mm.: maxima 28·3 × 20·7 and 28·2 × 21·0 mm.; minima 24·0 × 20·0 and 26·2 × 18·3 mm.

Habits. This is the most common form of Indian Nightjar and may be heard uttering its monotonous *tuk, tuk, tuk tukeroo* round any village or town or even in the gardens of big towns. It prefers light jungle or cultivation to forested jungle and feeds quite in the open, catching moths, beetles and insects, generally on the wing but sometimes also taking them on the ground. It perches freely, though on posts, railings, etc. rather than on trees.

Genus **LYNCORNIS.**

Lyncornis Gould, Icon. Av., 1838, pl. iv.

Type, *Lyncornis cerviniceps.*

This genus is distinguished from *Caprimulgus* by the absence of the rictal bristles and by the presence of ear-tufts or aigrettes consisting of a few elongated, erectile feathers just above and behind the ear-coverts. The sexes are alike.

The genus contains but one, or perhaps two, species, of which various geographical races are found from South India and Assam to New Guinea.

Lyncornis cerviniceps.

Key to Subspecies.

A. Wing over 290 mm..... *L. c. cerviniceps*, p. 374.
B. Wing under 290 mm. ..... *L. c. bourdilloni*, p. 375.

It is possible that with more material from Southern India it will be found that these two races are indistinguishable, but for the present the difference in size is sufficient to maintain them.

(1631) Lyncornis cerviniceps cerviniceps.

THE BURMESE GREAT EARED NIGHTJAR.

Lyncornis cerviniceps Gould, Icon. Av., ii, pl. iv (1838) (China—Tenasserim); Blanf. & Oates, iii, p. 192 (part).

Vernacular names. *Taung-dwong-nyet* (Burmese); *Din-koo-nah* (Assam).

Description. Crown golden-buff, vermiculated with brown and sometimes tinged with rufous; a few feathers from the crown to the nape black edged with rufous or buff; a well-defined collar of rufous-buff, the feathers with bases and bands of black; back and rump mottled black, buff and chestnut; scapulars vermiculated buff and brown with a line of black and chestnut patches; wing-coverts and inner secondaries vermiculated buff and black, the

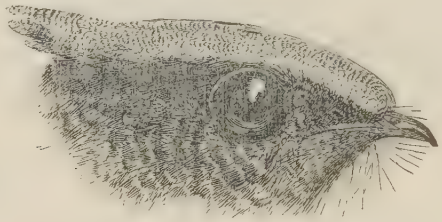

Fig. 63.—Head of *L. c. cerviniceps*. ⅔.

primary coverts and outer greater coverts more chestnut; primaries and outer secondaries black with mottled bars of chestnut; tail with alternate bars of black, rufous and grey, the first narrow, the other broader and mottled with black; a large white throat-patch; chin, throat, sides of the head and neck, and the breast barred black and chestnut; below the breast a well defined band of buff, the black bases of the feathers showing through; remainder of lower plumage, axillaries and under wing-coverts barred buff and black.

Colours of soft parts. Iris hazel to dark brown; bill pale pinkish-horny to pinkish-brown, the tip and culmen a little darker and the gape flesh-colour; legs and feet fleshy-brown to pale brown.

Measurements. Wing 292 to 317 mm.; tail 207 to 225 mm.; tarsus 21 to 22 mm.; culmen about 10 to 11 mm.

Distribution. Assam, South and East of the Brahmaputra; Manipur, Chittagong and Tippera in Eastern Bengal, practically throughout Burma to the North of the Malay Peninsula; South-West Siam.

Nidification. Hopwood found this fine Nightjar breeding in some numbers near Myingyan in the Upper Chindwin during

March. He describes their nidification as follows :—"There was no nest, the eggs being laid on the bare ground near a bamboo clump. The jungle was high forest, consisting mainly of teak, *Xylia dolabriformis*, *Terminalia*, etc. with bamboos, in fact typical hill forest, moderately dense. The situation was a hill range, lying between the Chindwin and Myittha Rivers. The forest itself is about twelve miles wide bounded by plains and cultivation and the elevation about 1,500 feet." Only one egg is laid which is typically that of a *Caprimulgus*. The ground-colour varies from pale creamy-salmon to warm salmon-red, the markings consisting of a few blotches of pale reddish with others, rather more numerous, of pale grey underlying them. For a nightjar's egg the markings are rather sparse but otherwise they can be matched by many eggs of the Common European Nightjar. The colour fades to a pale cream very quickly. The few eggs I have seen vary in size between $35{\cdot}3 \times 26{\cdot}9$ and $44{\cdot}1 \times 31{\cdot}5$, but the first egg, taken near Limpong, is an abnormally small egg. This egg was taken in April, but an egg found by Davison was taken on January the 10th.

Habits. In Burma this seems to be essentially a forest bird and Bingham found it roosting in caves in Tenasserim. This habit must, however, be exceptional as neither Hopwood, Mackenzie or Partridge found them thus and I myself have repeatedly put them up in scrub and light forest in daytime in Assam. In this Province they preferred patches of scrub and bush jungle on steep hillsides, surrounded by tree-forest, and I seldom found them inside the forests. They fly just like the common Nightjars but very swiftly though equally silently and capture their food on the wing. They eat beetles, moths and all night-wandering insects. Davison says that their note is a clear trisyllabic whistle but though I have often heard this beautiful call, the more common note is a loud wailing squeal which can be heard at a great distance. The ordinary position of the ears is almost erect and not depressed or semi-depressed as in the woodcut. These birds are found up to 3,000 feet but are most common on the lower hills under 2,000 feet.

(1632) Lyncornis cerviniceps bourdilloni.

BOURDILLON'S GREAT EARED NIGHTJAR.

Lyncornis bourdilloni Hume, Str. Feath., iii, p. 302 (1875) (South Travancore).
Lyncornis cerviniceps. Blanf. & Oates, iii, p. 192 (part).

Vernacular names. None recorded.

Description. Similar to the Burmese form but perhaps a little darker with less buff and more grey on the wings and upper plumage.

Colours of soft parts. Iris slate-blue; other parts as in *L. c. cerviniceps*.

Measurements. Wing 274 to 283 mm.; tail 182 to 203 mm.; tarsus about 21 mm.; culmen about 10 mm.

Distribution. South and Central Travancore only.

Nidification. Stewart found this Nightjar almost common in Travancore and took a very fine series of eggs. The birds commence laying early in January and the last eggs taken by him were laid in mid-May. Forty eggs average 40·0 × 28·8 mm.: maxima **43·8** × 30·0 and 43·3 × **31·5** mm.; minima **37·8** × 28·6 and 40·5 × **27·5** mm. When fresh they are certainly among the most beautiful of eggs. Stewart found them breeding generally in bush cover on broken hillsides but also in deciduous forest in thin undergrowth. Eggs were located in many cases by hearing the constant wailing cry of the male, who keeps very close to the spot where the egg is laid. The same site is occupied year after year.

Habits. As in the preceding bird. Bourdillon, who also found its eggs in Travancore, says that he found it not uncommon from sea-level up to about 2,000 feet and that it is especially fond of thorny bush-cover in or near forest. He adds that it has a most beautiful loud whistle of several notes which is uttered freely during the night.

Suborder PODARGI.

This Suborder is very close to the *Caprimulgi* but differs in having the palate *desmognathous*, no basipterygoid processes and no oil-gland; there are powder-down patches on either side of the rump.

The sternum has a low keel and a pair of deep incisions on each side of the exterior border; the stomach is muscular. Young helpless and downy.

Family PODARGIDÆ.

The bill in this family differs greatly from that of the *Caprimulgidæ*, although the gape is equally wide. In the Frogmouths the bill is much larger, powerful and hard, much curved and with hooked tip; the base is overhung by bristly feathers, concealing the nostrils, which are narrow slots protected by membranes.

The family is found throughout the Oriental and Australian regions.

Genus BATRACHOSTOMUS.

Batrachostomus Gould, Icon. Av., ii, p. 13, pl. xvii (1838.)

Type, *Batrachostomus auritus* Gray. Malay Peninsula etc.

In this genus the wings are rounded and short, the 4th and 5th quills subequal and longest; occasionally the 5th longest; there are no rictal bristles but there are conspicuous bristly feathers at the base of the bill, tufts of similar feathers in front of the eyes and ear-tufts with bristles at the end of the feathers; the gape is even larger than in the Nightjars, the corners swollen and enlarged; nostrils concealed; the tarsus is short and the feet small and feeble, the middle toe greatly elongated.

Sexes differing considerably in colour.

This genus is closely allied to the Australian genus *Podargus* and is found over the greater part of the Australasian region.

Key to Species.

A. General colour speckled greyish-brown.
  a. Crown with irregular black blotches; wing over 125 mm. ..... *B. javensis*, ♂, p. 378.
  b. Crown without black blotches; wing under 125 mm. ..... *B. affinis*, ♂, p. 380.
  c. Crown with round black spots, edged posteriorly with white ..... *B. moniliger*, ♂, p. 381.

B. General colour chestnut.
d. Scapulars with broad white patches; no white spots on wing-coverts.
a. Wing over 125 mm. ..... *B. javensis*, ♀, p. 379.
b. Wing under 125 mm..... *B. affinis*, ♀, p. 381.
e. Scapulars without any white; round white spots on wing-coverts ..... *B. moniliger*, ♀, p. 382.

Batrachostomus javensis.

Podargus javensis Horsf., Trans. Linn. Soc., xiii, p. 141 (1821).

Type-locality: Java.

The typical form from Java differs from *B. j. hodgsoni* found in N.E. India and Burma in having a larger bill.

The status of some of the geographical forms of *Batrachostomus* is very puzzling. *B. javensis* and *B. hodgsoni* are almost identical, only differing in degree of size and depth of colouring, and it seems imperative to treat them as geographical races of the same species. On the other hand, we have intervening between the two areas occupied by these birds (Sumatra and Borneo on the one hand and N.E. India and Burma on the other) a form which does not lead from one to the other but differs essentially from both and is, in fact, nearer in relationship to another form found in South-West India than to either of them.

Fig. 64.—Head of *B. j. hodgsoni*, ♂. ½.

(1633) Batrachostomus javensis hodgsoni.

Hodgson's Frogmouth.

Otothrix hodgsoni Gray, P. Z. S., 1859, p. 101 (Darjeeling).
Batrachostomus hodgsoni. Blanf. & Oates, iii, p. 194.

Vernacular names. *Sumbong* (Manipuri Naga).

Description.—Male. Upper plumage principally dull rufous-brown and blackish in narrow wavy bars; the crown blotched with black and with a few obsolete pale buff bars and patches;

NEST AND EGGS OF BATRACHOSTOMUS HODGSONI, 2/3.
Hodgson's Frogmouth.

nape more rufous, forming an indistinct collar and, behind this, a broken collar of black and white; lores and supercilia buff and black mixed, the former predominating; back and wing-coverts with a few black spots, those on the wing edged with pale buff; scapulars and innermost secondaries with a considerable amount of white mottling; primaries brown, barred with rufous-white on the outer web and mottled at the tip; tail-feathers narrowly barred with black and with alternating bands of mottled brown and mottled buff; chin and throat mixed rufous and blackish; remainder of lower plumage mottled, barred and spotted with rufous-brown, black and buffy-white, the breast generally more barred with rufous and black.

Colours of soft parts. Iris marbled buff, marbled yellow and brown, or brown with a few streaks of gold; bill madder-pink, fleshy tinged with violet or horny-yellow, paler below; legs and feet fleshy-pink to light madder.

Measurements. Wing 126 to 141 mm.; tail 131 to 143 mm.; tarsus about 15 to 16 mm.; culmen 17 to 18 mm.; breadth at gape 29 to 32 mm.

Female. Chestnut throughout, richer above, paler on the abdomen; lores and supercilium pale buff and whitish; a well-defined nuchal collar of white feathers banded with black; scapulars with the dorsal patches of white bordered with black on the outer webs; tail-feathers with fine double bars of blackish on a rather darker chestnut ground; a band of white feathers edged with black across the throat, a second similar band across the lower breast and one of the same nature showing on the breast and flanks.

Nestling covered with bright rufous down.

Young birds are like the adult female but duller and are barred everywhere with dull blackish-brown; signs of the collar show very early. Iris dull brown; bill horny-grey, pinkish above.

Distribution. Sikkim, Bhutan, the hills of Assam both North and South of the Brahmaputra; Manipur, Tippera and Chittagong in E. Bengal; Central Burma from Karenni to Tenasserim.

Nidification. I found this bird breeding in some numbers in Assam from the end of April to the middle of June but I have taken one nest as early as the 23rd March and another as late as the 23rd August. In the hills South of the Brahmaputra it frequented elevations between 2,500 and 6,000 feet, generally above 3,500 feet but in Northern Assam we got it as low as 1,000 feet, the temperatures in both cases being much the same. I only found its nests in the densest and most humid of evergreen forest and it seemed to prefer those on steep hillsides with broken ravines and many rocks and boulders. The nest is a small pad made entirely of the down and tiny feathers from the breast and abdomen of the female. It measures anything between $2\frac{1}{2}$ and $3\frac{1}{2}$ inches in diameter by about one inch or less in depth, the

depression for the eggs being about half an inch. They are invariably placed on horizontal branches of small trees between five and fifteen feet from the ground and the material of the nest is firmly wedged into the crevices of the bark and so compactly felted together that it requires some force to remove. All over the nest outside is added scraps of lichen, bark, dried moss, spiders' egg-bags, etc., so that the nest looks just like an excrescence of the branch itself and is extremely hard to find. The cock bird, which does all the sitting during the daytime, remains on the nest until the last moment and I have more than once caught him with my hand alone. The eggs are always two in number, pure white, rather fragile with a smooth surface and very fine texture like that of a Barbet's egg; in shape they are long ellipses, sometimes slightly oval. Thirty eggs average 26·5×17·6 mm.: maxima 28·1×19·5 mm.; minima 24·4×16·3 mm.

Habits. This bird is not uncommon in Assam but it is so nocturnal in its habits that it is very seldom seen, in addition to which it seems to keep almost entirely to the interior of dense evergreen forest. It is extraordinarily tame and confiding and will feed, swoop about and perch within a few feet of anyone watching it. A pair whose nest I had found but not taken returned to the nest whilst a Naga boy and I stood within a yard of it. The male settled in the nest and the female perched close by, both uttering a soft "croo-croo" as they did so. That night, in bright moonlight, I watched this pair hawking insects etc. in a glade close by and noticed their actions were just like those of Nightjars except that they never settled on the ground. On trees they normally sit lengthways on rather large branches but every now and then perch upright on smaller ones. I have heard a loud, squealing note in the forest at night which the Nagas, I think rightly, attribute to this bird. Their food consists largely of beetles and moths and I have seen them hawking and feeding greedily on a very unpleasant and swiftly flying bug.

(1634) Batrachostomus affinis.

BLYTH'S FROGMOUTH.

Batrachostomus affinis Blyth, J. A. S. B., xvi, p. 1180 (1847) (Malacca); Blanf. & Oates, iii, p. 196.

Vernacular names. None recorded.

Description.—Male. Very similar to Hodgson's Frogmouth but without the black markings on the crown and nape; there are generally a few pale buff or whitish spots and specks on these parts; the general upper tone is a little more rufous and a little less brown; the breast is much more rufous or chestnut.

Colours of soft parts as in *B. hodgsoni*.

Measurements. Wing 108 to 120 mm.; tail 102 to 108 mm.; tarsus about 14 to 15 mm.; culmen 16 to 18 mm.; breadth at gape 32 to 34 mm.

Female similar to that of Hodgson's Frogmouth but darker and duller chestnut.

Young birds are finely barred above and below with dark brown but are otherwise like the female.

Distribution. Malay Peninsula, Borneo, Peninsular Siam and once Tenasserim at Thougyeen.

Nidification. Two nests sent me from Simpang, Federated Malay States, are small replicas of those of the preceding bird. They measure about two inches in diameter and both had been built on the upper surface of branches of small trees, standing by a stream in dense forest. They are made entirely of down from the birds' breast, both from that of the male and of the female, decorated outside with scraps to imitate the bark. The two eggs and one egg they contained measure 23·2 × 16·3 to 24·5 × 17·2 mm. and only differ from the preceding birds' eggs in being smaller. A nest in the Selangor Museum is composed of down only with no decorations and measures only 1½ inches in diameter, the single egg practically filling the nest.

Habits. Those of the genus.

(1635) Batrachostomus moniliger.

THE CEYLON FROGMOUTH.

Batrachostomus moniliger (Layard) Blyth, J. A. S. B., xviii, p. 806 (1849) (Ceylon); Blanf. & Oates, iii, p. 196.

Vernacular names. None recorded.

Description.—Male. General colour above grey-brown, the feathers being very finely vermiculated pale buff and brown; crown, nape and back spotted with black, those on the crown and nape edged with white; an obsolete pale rufous collar followed by a much better defined white one; scapulars and innermost secondaries white with black subtips and narrow wavy bars of blackish; tail with alternate bands of mottled grey and mottled chestnut, each bar edged with black; primaries dark brown, the outer webs marked with rufous and the tips mottled; chin, throat and breast vermiculated buff and dark brown; an imperfect band of white and black below the throat; abdomen much paler and more mottled with white and with black spots or bars.

Colours of soft parts. Iris yellow, or marbled yellow and grey; bill pale brownish, olive-brown or fleshy-horny, the base and gonys paler and more pink; legs and feet fleshy-grey to fleshy-pink.

Measurements. Wing 110 to 125 mm.; tail 101 to 112 mm.; tarsus about 15 mm.; culmen 17 to 18 mm.; breadth at gape 32 to 34 mm.

Female. Similar to that of *B. affinis* but with the median and greater coverts boldly spotted with white, margined with black; scapulars and innermost secondaries with tiny black and white apical spots; under plumage a much deeper rufous.

Some males are rather chestnut in tinge, probably due to youth.

Young birds are barred above with narrow bars of brown.

Nestlings covered with pure white down (*T. R. Bell*).

Distribution. Ceylon, Travancore and the Wynaad.

Nidification. This Frogmouth breeds in Travancore from January to May and again in September and October whilst Bell took nests in Karwar in March. The nests are exactly like those of *B. j. hodgsoni*, but rather smaller, and are placed in similar situations though Stewart, who has taken numerous nests, says that occasionally these are placed in deciduous forest and are quite conspicuous. The cock bird sits as close as do the other members of this genus and allows itself to be photographed without trouble. Only one egg is laid, which only differs from that of Hodgson's Frogmouth in being larger. Thirty eggs average 29·9 × 20·6 mm.: maxima 31·1 × 23·0 mm.; minima 27·6 × 19·0 mm.

Habits. Those of the genus except that it is not so entirely confined to dense evergreen forest. Its ordinary call has been likened to "a soft Kooroo-koroo," repeated several times.

Suborder **STRIGES.**

The Owls superficially appear to form a very well marked group; their external likeness, especially their powerful rending beaks and strong tarsi and talons, seeming to ally them to the *Accipitres* or diurnal Birds of Prey. It is, however, now generally accepted that these apparently strong resemblances are the result of convergent evolution and not due to a common descent.

The most conspicuous external characteristics are the reversible outer toe, the facial disc, the frontal position of the eyes and the curious development of the external ear. The first two of these features would seem to confirm the affinity of the *Accipitres* and *Striges*, for we find the Osprey and, to a less extent, the Fish-Eagles with reversible outer toes and the Harriers showing distinct ruffs. In other respects and especially in their anatomy the birds are very different from the Hawks and Eagles. On the other hand, they agree with the *Caprimulgi* in several important points; among these may be mentioned the entire absence of down in the adult; the nude oil-gland; the absence of the ambiens, accessory femoro-caudal, the semitendinosus and accessory semitendinosus muscles.

The skull is schizognathous and possesses basipterygoid processes, sometimes with a desmognathous tendency.

The nestling down of the *Striges* is very different from that of the *Accipitres*, having two stages of plumage, the second retaining a well-developed axis, or rachis, bearing a vane of loosely interlocked barbs.

The spinal feather-tract is well developed*. There is no after-shaft; the *flexor longis hallucis* leads to the hallux and the *flexor perforans digitorum* to the remaining three digits, the two tendons being united by a broad vinculum. Both carotids are present and the cæca are very large and flask-shaped. Cervical vertebræ fourteen.

The feet are invariably powerful and furnished with very strong curved claws with immense grasping but not striking power. There are eleven primaries.

Key to Families.

A. Skull long and narrow, breadth much less than two-thirds of length; furcula united to keel of sternum ..... **Tytonidæ**, p. 384.

B. Skull broad, generally equal to about two-thirds of length; furcula not in contact with sternum ..... **Asionidæ**, p. 389.

* For further details of the Pterylosis see Pycraft, Trans. Linn. Soc., 1898. vol. vii, ser. Zoology.

Family TYTONIDÆ.

Hinder margin of sternum with a single shallow notch on each side; furcula anchylosed to keel of sternum; no manubrium sterni; skull long and narrow; second joint of third toe considerably larger than the basal joint (Beddard, Ibis, 1888, p. 340).

This family contains two genera—*Tyto*, which is almost cosmopolitan, and *Heliodilus*, peculiar to Madagascar.

Genus TYTO.

Tyto Billberg, Syn. Faun. Scand., i, tab. A (1828).

Type, *Strix flammea* = *S. alba* Scop.

The generic name *Strix* was first applied to birds of another genus, the Tawny Owls and not to the Barn-Owls and cannot therefore be used for them. *Tyto* is the next name available for this genus and *Strix* of Linnæus must replace *Syrnium* of Savigny for the Tawny Owls or Wood-Owls.

In this genus there are no ear-tufts. The facial disk is well developed and large and is entirely surrounded by a ruff of stiff feathers, the bill is straight at the base, compressed and comparatively weak; the nostrils are oval. The legs are long, the upper part clothed with feathers which pass into bristles on the lower tarsus and upper surface of the toes; middle toe very little longer than the inner; middle claws expanded and pectinate on the inner side. Wings very long and pointed, exceeding the tail; second quill longest, the first slightly shorter; tail moderate.

Key to Species.

A. Upper surface speckled; tarsus less than 75 mm. ..... *T. alba*, p. 384.
B. Upper surface spotted, not speckled; tarsus over 75 mm. ..... *T. longimembris*, p. 387.

Tyto alba.

Strix alba Scop., Ann. I. Hist. Nat., p. 21 (1769).

Type-locality: North Italy.

The typical form is larger than our Indian bird with weaker legs and feet and is less spotted below.

Key to Subspecies.

A. Wing over 270 mm.; general colour paler ..... *T. a. javanica*, p. 385.
B. Wing under 270 mm.; general colour deeper ..... *T. a. deroepstorffi*, p. 386.

(1636) Tyto alba javanica.

THE INDIAN BARN-OWL.

Strix javanica Gmelin, Syst. Nat., i, p. 295 (1788) (Java).
Strix flammea. Blanf. & Oates, iii, p. 264 (part).

Vernacular names. *Kuraya, Karail, Búri-churi* (Hind.); *Bhutum pecha* (Beng.); *Ghubad* (Mahr.); *Chaao pitta* (Tel.); *Chava kuravi* (Tam.); *Bakamuna* (Cing.).

Description. Facial disk white, sometimes tinged with rufous, more especially on the lores; feathers round the eye and a spot in front of and above the eye rufous; ruff white or creamy-white,

Fig. 65.—Head of *T. a. javanica.* ½.

subtipped fulvous and tipped dark rufous-brown; upper plumage and wing-coverts vermiculated pale grey-brown and white, the general tone being pale grey, each feather with a subterminal white spot with black edges above and below; the scapulars and wing-coverts are always much mixed with bright light ochre, the outer webs of the scapulars and tips of the coverts being occasionally all of this colour lightly barred with grey, quills mostly rufous-ochre, mottled, especially on the edges of the outer webs and tips, with grey and barred with dark brown; rectrices like the wing-quills but with more strongly-marked bars; lower aspect of tail very pale; lower parts white, sometimes more or less tinged buff and spotted freely with dark brown, the breast and fore-neck being sometimes immaculate.

The colour of the upper parts varies greatly. In some specimens the bright ochre is so extensive that the prevailing colour of these parts is ochre and not grey, whilst in others the ochre is practically confined to the wings and tail.

Colours of soft parts. Iris deep brown, hazel or black; bill fleshy-white to fleshy-horny, the cere more flesh-coloured; legs and feet pale fleshy-brown, the claws darker.

Measurements. Wing 275 to 322 mm.; tail 119 to 127 mm.; tarsus about 68 to 77 mm.; culmen 30 to 32 mm.

Distribution. Ceylon, the whole of India, Burma, the extreme South of the Malay Peninsula to Java and Siam.

Nidification. The Indian Barn-Owl seems to breed in most months of the year except during those of the heaviest rainfall, July and August. In the Central Provinces Hume says they lay from November to January; in upper India they lay from February to June. In Ceylon June and July are dry months and they breed at that time. In Assam they breed from March to early June and a second time from late September to December. Where available they prefer buildings, either the roof, holes in walls or similar convenient places, but they also make use of holes in wells and banks and, often, hollow trees. As a rule no nest is made, though occasionally a little grass, straw and other rubbish is collected, whilst frequently the eggs are laid year after year on an accumulating pile of animal remnants and pellets of disgorged remains. The eggs number four to seven and are, like all Owls' eggs, white with a smooth but glossless texture. Fifty eggs average 41·1 × 33·4 mm.: maxima **45·3** × 33·5 and 41·0 × **35·0** mm.; minima **39·0** × **31·4** mm.

Habits. The Barn-Owls feed to a great extent on rats and mice, but they will devour any small animal or bird and sometimes kill birds of considerable size, such as partridges, quail, etc. The undigested portions are ejected through the mouth in the shape of pellets. It is a truly nocturnal Owl, feeding through the night and not only in the late and early twilights whilst its weird screams and screeches may be heard at all hours. Its flight is powerful and swift yet peculiarly noiseless but when not pressed it often flaps slowly from one point to another whilst searching for food.

(1637) Tyto alba deroepstorffi.

THE ANDAMAN BARN-OWL.

Strix De-Roepstorffi Hume, Str. Feath., iii, p. 390 (1875) (Andamans).
Strix flammea. Blanf. & Oates, iii, p. 264 (part).

Vernacular names. None recorded.

Description. Similar in markings to the preceding bird but everywhere very dark; on the upper surface the grey is replaced by dark brown and the ochre by rich rufous, a certain amount of grey stippling remaining on the tips of the wing- and tail-quills; the facial disk is very rufescent and the underparts, axillaries and under wing-coverts are deep, rather brownish-rufous.

Colours of soft parts not recorded.

Measurements. Wing 250 to 264 mm.; tail about 113 mm.; tarsus about 61 mm.; culmen about 32 mm.

Distribution. Andamans only. Two specimens only have been obtained, one of which is in the British Museum and the other in the Tring Museum.

Nidification. Nothing recorded. It must nest in trees in the Andamans as there are no other suitable positions for it.

Habits. Probably similar to those of other Barn-Owls but there is nothing recorded. It seems to be a bird of forests and the open spaces adjoining them.

(1638) Tyto longimembris*.

THE GRASS-OWL.

Strix longimembris Jerdon, Madr. Journ. Lit. Sci., x, p. 86 (1839) (Madras).
Strix candida. Blanf. & Oates, iii, p. 266.

Vernacular names. *Sun-Oloo-sorai* (Assam).

Description. Disk pure white to pale pinkish-ferruginous; ruff pure white in a few specimens, dark brown above in most and nearly always tipped above and below with ferruginous brown; a dark brown spot above the eye; upper plumage dark rich brown, each feather with a spot of white near the tip, usually very small, sometimes rather larger; the bases of the feathers and most of the outer edges are orange-buff and show through in a varying degree, most conspicuously so on the neck; innermost lesser wing-coverts orange-buff speckled with brown; median and greater coverts brown, the inner coverts more or less mottled with orange-buff, tipped with brown, more or less mottled with brown on the outer edges of the terminal halves, white on the edges of the inner webs and barred with dark brown; tail white or buffy-white, mottled at the tip and barred with dark brown, the markings obsolete or absent on the outermost pair; lower surface white, generally suffused with buff on the breast and flanks and lightly spotted on these parts with dull brown.

Colours of soft parts. Iris hazel to deep brown; bill fleshy-white to fleshy-horny; the cere more decidedly pink: legs and feet dark fleshy-brown to almost blackish-brown; claws horny-brown.

Measurements. Wing 305 to 348 mm.; tail 114 to 125 mm.; tarsus 86 to 94 mm.; culmen about 36 mm.

Nestling in down is fulvous-rufous.

Distribution. The sub-Himalayas from Dehra Dun to Eastern Assam; Bengal, East of the Bay, and Purnea, Maldah, etc.; Balaghat and Raipur in the Central Provinces; Southern India in Nellore, Carnatic, Nilgiris and adjoining Hills.

Nidification. This Owl breeds during the Cold Weather in India from October to March but in the hills of North Cachar I found eggs in July. The eggs are always laid on the ground and nearly always on level ground in fairly long grass. Occasionally the nest is made in quite short grass and one nest I found in grass

* The name *candida* Tickell, 1833, is preoccupied by Latham, Ind. Orn. Suppl. p. xiv (1787) and cannot therefore be used.

only a few inches high, but this was in a hollow in the side of a very steep bank of a stream. The eggs number four to six and are laid on a good pad or nest of soft shreds of grass, sometimes a couple of inches thick. Forty eggs average 39·9 × 32·7 mm.: maxima **42·7** × 33·6 and 42·1 × **34**·0 mm.; minima **36·0** × **30·0** mm.

Habits. The Grass-Owl inhabits the immense plains of long grass found in the lower hills, or Terai, of the Himalayas and the adjoining plains of Bihar, Bengal and Assam. Even where these Owls are common they are but seldom seen unless put up by parties shooting big game but I have often seen them when benighted out Gaur-shooting. Their extraordinary calls are just like those of the Barn-Owl and their flight is the same ghostly glide past of a grey shadow, with a soft flip-flap as they alight on a tree or once more leave it. They eat not only field-mice and similar small mammals but small reptiles, such as frogs and the smaller harmless snakes, and they also eat other birds' eggs and young. I have also seen the remains of locusts, grasshoppers and cicadæ in their pellets and such, probably, form a large portion of their food.

Family ASIONIDÆ.

Hinder margin of sternum with two deep incisions on either side; furcula free, not attached to the keel of the sternum, imperfect in some genera; a small unforked manubrium (*spina externa*) is present; skull broad; basal and second joints of middle toe subequal in length.

I retain Blanford's three subfamilies which are easily diagnosed and form a convenient basis of classification both for the field-naturalist and the Museum student.

Key to Subfamilies.

A. Facial disk and ruff well marked.
  a. Ear-orifice smaller than eye; no operculum; middle claw pectinate ..... *Phodilinæ*, p. 389.
  b. Ear-orifice larger than eye and furnished with an operculum; middle claw simple ..... *Asioninæ*, p. 392.
B. Facial disk and ruff absent or obsolete ..... *Buboninæ*, p. 405.

Subfamily PHODILINÆ.

Characters those of the genus.

Genus **PHODILUS**.

Phodilus I. Geoffr. St.-Hilaire, Ann. Sci. Nat., xxi, p. 200 (1830).

Type, *Strix badia* Horsf.

This genus is intermediate in many respects between the *Tytonidæ* and the *Asionidæ* but nearer to the latter, having a broad skull. The disk is distinct but the ruff not complete above the eyes; bill weak and compressed; ear-orifice smaller than the eye but of fair size; no operculum; the wings are rounded, the fourth and fifth quills subequal and longest; tail short; the tarsus is feathered throughout, inner toe longer than middle toe; middle claw pectinate as in *Tyto*.

Phodilus badius.

Key to Subspecies.

A. Upper parts not speckled with black; inner webs of primaries chestnut barred with black.
  a. Smaller, wing under 212 mm. ..... *P. b. badius*, p. 390.
  b. Bigger, wing over 213 mm. ..... *P. b. saturatus*, p. 390.
B. Upper parts speckled, not spotted with black; inner webs of primaries brown.. *P. b. assimilis*, p. 391.

(1639) Phodilus badius badius.

THE BAY OWL.

Strix badia Horsf., Res. Java, pl. 37 (1824) (Java).
Photodilus badius. Blanf. & Oates, iii, p. 268.

Vernacular names. None recorded.

Description. Forehead, anterior crown and facial disk vinous pink; feathers round the eye chestnut; ruff white, the feathers tipped with chestnut and blackish; posterior crown and nape chestnut, sparsely or obsoletely spotted with black and with two or three buff feathers, each with a black spot, on the centre of the nape; upper plumage paler chestnut than the crown, spotted with black and with bases of rich buff showing through here and there; scapulars nearly all buff with double black spots divided by a white one; innermost wing-coverts like the scapulars, outer coverts all chestnut; greater coverts, primary coverts and quills chestnut barred with black; outermost two primaries and bastard wing barred with white and black on the outer webs, the black bars edged with chestnut; third primary also with some white near the tip; lower plumage vinous pink, more or less tinged buff where the bases of the feathers show through, principally so on the breast and flanks; spots of blackish edged with white everywhere except on fore-neck, centre of abdomen, vent and under tail-coverts; tail chestnut barred with black.

Colours of soft parts. Iris deep brown or black; bill creamy-yellow; legs and feet clay-brown or yellowish-brown, the claws paler.

Measurements. Wing, Java and Borneo, 175 to 197 mm.; Burma, 192 to 211 mm.; tail 75 to 97 mm.; tarsus about 46 to 47 mm.; culmen 27 to 30, rarely 31 mm. in Burma.

Distribution. The wetter portions of Central and Eastern Burma, where however it is very rare, Tenasserim, Malay Peninsula, Borneo and Java.

Nidification. Unknown.

Habits. Nothing recorded beyond the fact that it haunts forests. Probably its habits will not be found to differ in any way from those of the next race.

(1640) Phodilus badius saturatus*.

THE NORTHERN BAY OWL.

Phodilus badius saturatus Robinson, Bull. B. O. C., xlvii, p. 121 (1927) (Native Sikkim).
Photodilus badius. Blanf. & Oates, iii, p. 268.

Vernacular names. None recorded.

* *Phodilus nipalensis* of Gray (Hume, Str. Feath. i, p. 429 (1873) (Nepal)) is undoubtedly merely Scops Owl.

Description. Very similar to the preceding race but, perhaps, on an average paler and decidedly larger.

Colours of soft parts as in the other races.

Measurements. Wing 214 to 237 mm.; tail 92 to 97 mm.; tarsus 47 to 48 mm.; culmen 30 to 32 mm.

Distribution. Nepal, Sikkim, Assam North and South of the Brahmaputra, Manipur. Specimens obtained in the Karen Hills and Tounghoo having wings between 194 and 213 mm. are referred by Robinson to this race but seem to me to be nearer true *badius*, being darker as well as smaller.

Nidification. I found this most beautiful Owl breeding in March, April, and early May in the hills South of the Brahmaputra, from the foothills up to about 3,000 feet and less often up to 5,000 feet. The eggs are invariably deposited in holes in trees, generally large natural hollows with wide entrances. There is no nest, but as the birds use the same hollow many years in succession there is always a large accumulation of food remnants. The eggs number three or four only and are of the usual oval type but perhaps rather a soft texture, for they stain very easily. Twenty eggs average 35·1 × 29·9 mm.: maxima **37·0 × 31·0** mm.; minima **33·2** × 29·0 and 36·0 × **28·5** mm.

Habits. The Bay Owls are essentially forest birds, keeping for the most part to the interior of evergreen and of pine forests. They are entirely nocturnal in their habits and in the day-time are the most stupid and incapable of all Owls, allowing themselves to be captured by hand and, when released, sitting dazed in the sunlight. They have a single soft hoot but during the breeding-season excel all other Owls in the appalling nature of their cries. One bird which had its eggs in a hole in a tree above a rest-house I was in made night hideous with cries like those of half-a-dozen cats fighting. Their food consists of small mammals and birds, lizards, frogs, insects and, possibly, fish; for they are certainly very fond of frequenting pools and river-sides by night. Their flight is swift and absolutely noiseless.

(1641) Phodilus badius assimilis.

THE CEYLON BAY OWL.

Phodilus assimilis Hume, Str. Feath., i, p. 429 (1873) (Ceylon).
Photodilus assimilis. Blanf. & Oates, iii, p. 269.

Vernacular names. *Bassa* (Cing.); *Andai, Pakkul* (Tam.).

Description. Differs from the preceding bird in being much darker above and in being much more freely marked with black; the chestnut of the crown, back, wings, etc., is almost a chestnut-brown; the black bars on the tail are more numerous and the bars on the wing-quills extend across the outer as well as the inner webs, and the chestnut of the primaries is mottled with brown on

the inner webs; the spots on the lower surface are double, one behind the other along the shaft divided by, and edged with, whitish.

Colours of soft parts. Iris dark brown; bill greenish-white; feet pale whitish-green, claws pale ash (*Whyte*).

Measurements. Wing 197 to 203 mm.; tail 81 to 89 mm.; tarsus about 47 mm.; culmen about 30 mm.

Distribution. Ceylon only.

Nidification. This Bay Owl apparently breeds in Ceylon during October and November, three young having been taken from a hole in a tree during the latter month.

Habits. Like the last this is entirely a forest bird, only venturing into the open during the night. The natives of Ceylon give it the credit of being responsible for most of the unearthly cries to be heard in the Ceylon jungles by night and call it the Devil Bird. It is not found in the higher hills and is restricted to those under 3000 feet and to the adjoining plains. It is said to be very rare but this is probably only on account of its nocturnal habits.

Subfamily ASIONINÆ.

Ear-orifice large, exceeding the eye in size, lunate or ovoid in shape and furnished with an operculum; facial disk well marked and nearly as high above the eyes as below them; ruff distinct.

The subfamily has a circumpolar range in the Palæarctic and Subpalæarctic areas. Two genera are found within Indian limits.

Key to Genera.

A. Aigrettes present; 2nd primary longest ..... Asio, p. 392.
B. No aigrettes; 3rd, 4th or 5th quill longest ..... Strix, p. 396.

Genus **ASIO**.

Asio Schaeffer, Elementa Orn., no. 67, Tab. gen. (1779).

Type, *Strix otus* Linn.

Aigrettes present but varying in size. Bill short and strong, the part covered by the cere longer than the rest of the culmen; tarsus and upper part of toes thickly feathered; facial disk well marked and the ruff complete or nearly so; wings long and pointed; 2nd quill longest, the 3rd nearly equal; tail moderate and rounded. Iris yellow.

Key to Species.

A. Transverse as well as longitudinal markings on abdomen ..... *A. otus*, p. 393.
B. No transverse markings on abdomen ..... *A. flammeus*, p. 394.

(1642) Asio otus otus.

THE LONG-EARED OWL.

Strix otus Linn., Syst. Nat., 10th ed., i. p. 92 (1758) (Sweden).
Asio otus. Blanf. & Oates, iii, p. 270.

Vernacular names. None recorded.

Description. Anterior half of disk, chin and throat white, the feathers of the disk ending in black bristles; round the eye and from below the eye to the gape dark brown; posterior half of disk tawny with black shafts; ruff white at the base, tipped with brown and more or less mottled with rufous and brown; aigrettes blackish-brown, edged buff and the inner webs mostly white mottled with dark brown; feathers of the upper plumage with longitudinal brown centres, the bases buff showing through to some extent and the rest of the feathers mottled white and brown; the feathers of the hind-neck have more buff and less white than elsewhere; primary coverts dark brown faintly mottled and banded paler; primaries dark brown, the terminal halves with broad, mottled bars of grey and brown, the basal halves with buff bands and wholly buff at their bases; the secondaries more grey and the innermost all mottled grey and brown with narrow dark brown bars and concealed buff bases; the scapulars have a few white or pale buff patches next the coverts; tail buff at the base turning to mottled grey at the tips, the central feathers with five or six, the lateral with more numerous bars of dark brown; lower parts buffy-white to darker creamy-buff with broad brown central streaks, the webs adjacent to the centres white with narrow wavy bars of brown, numerous on the abdomen and flanks, absent on the upper breast; thighs, leg feathers and under tail-coverts pure buff; axillaries and under wing-coverts white with blackish bases and tips and more or less washed with buff.

Colours of soft parts. Iris golden yellow to orange-yellow; bill dark horny-black, the cere flesh-colour; legs and feet dark brown, the soles paler; claws horny-brown with black tips.

Measurements. Wing 285 to 305 mm.; rarely as little as 280 mm. or as much as 310 mm.; tail 140 to 155 mm.; tarsus about 40 mm. (Hartert); culmen about 28 to 29 mm.; cere about 6 to 8 mm.

Nestling. Down all white.

Distribution. Practically all Europe and North Asia; North-West Africa to the Azores; Central West Asia to Persia and Kashmir.

Nidification. The only record of this Owl's breeding in India is that of Lieut. B. A. G. Shelley, who obtained four eggs and shot one bird from an old nest, probably that of a Crow, on the 4th June, 1895, at Gurais, Kashmir. This was at an elevation of about 9,000 feet, and other birds of this species were heard in the

vicinity. In Europe it breeds in old nests of the larger birds but occasionally on the ground on open moors and commons or on grass and heather covered sand dunes. In the latter case the nest is a mere scrape, filled with fallen leaves or consists of the growing grass beaten down to form a bed. The eggs number four or five, rarely as many as seven or eight when food is specially plentiful as during plagues of Lemmings etc. One hundred eggs average 40·3 × 32·2 mm.: maxima **44·7** × 30·2 and 42·3 × **34·4** mm.; minima **36·0** × 30·6 and 38·0 × **28·7** mm. The breeding-season is from the middle of March to early May.

Habits. The Long-eared Owl is a crepuscular or nocturnal bird, haunting light forest or fir and pine woods, roosting by day on some large branch generally close to the trunk of the tree where it is very inconspicuous. In Sind Bell says that it rests during the day under a bush. It feeds on all sorts of small mammals and birds as well as on beetles etc. The call is a low, long drawn moan, which Witherby syllabifies as "oo-oo-oo," and adds "when the nesting place is invaded, the birds cry continually 'oo-ack, oo-ack,' prefaced sometimes by a barking 'woof, woof.'" In India the Long-eared Owl is only a Winter visitor extending into the plains of the Punjab, Sind and Cutch, but it probably breeds in the higher Himalayas from Gilgit to Sikkim. When on migration it collects in flocks and Blanford twice met with flocks in Sind, though Ticehurst says that single birds or pairs are more common.

(1643) **Asio flammeus flammeus.**

THE SHORT-EARED OWL.

Strix flammea Pontoppidan, Danske Atlas, i, p. 617 (1763) (Denmark).
Asio accipitrinus. Blanf. & Oates, iii, p. 271.

Vernacular names. *Bassa* (Cing.).

Description. Round the eye black; lores and front portion of disk white with a few bristly black feathers on the lores and forehead; feathers of posterior portion of disk varying from buffy white to dull buff generally black-shafted and streaky in appearance; ruff dark brown, the feathers white at the base, speckled at the tips with brown and rufous or buff; aigrettes blackish-brown more or less edged with pale buff to deep rufous; the upper parts dark brown, each feather edged with paler, varying from pale buffy white to rufous, the rump and upper tail-coverts being nearly all this colour; scapulars with broad patches of white on the outer webs; wing-coverts and inner secondaries like the back; primaries dark brown, the outer with buff bases and all barred with fulvous white to rufous; secondaries barred dark brown and rufous or fulvous white and mottled with whitish at the tips; tail barred rufous and blackish, the dark bars almost disappearing on the outermost pair; lower parts white to buff, the breast nearly always

strongly suffused with the latter; the breast and fore-neck have broad central streaks of blackish which gradually get narrow on the posterior flanks and upper abdomen, sometimes disappearing altogether on the lower abdomen, vent, thigh-coverts and lower tail-coverts.

Colours of soft parts. Iris deep golden yellow; bill, feet and claws blackish.

Measurements. Wing 290 to 330 mm.; tail 141 to 155 mm.; tarsus 33 to 42 mm.; culmen 25 to 29 mm.

Fig. 66.—Head of *A. f. flammeus.* ½.

Distribution. Palæarctic Europe and Asia and the greater part of Central Europe, wandering South in Winter into Northern Africa and to India and Burma. According to Hartert it also breeds in North America, being found in Winter as far South as California, Guatemala, Louisiana and Cuba. It has once been found within our limits as far South as the Malay Peninsula and is some years a comparatively common visitor to Ceylon.

Nidification. In Europe the Short-eared Owl breeds during April, May and June according to locality. There is no real nest, just a hollow being scraped in the ground and filled with fallen leaves or grass or beaten-down heather or rushes. It prefers grassy commons, heather-covered moors or sand dunes covered with coarse grass, but it also sometimes breeds on the edges of swamps and marshes. Normally the eggs number five to seven, but as with the Long-eared Owls, in times of great food plenty as many as a dozen or even fourteen have been taken from one nest. A hundred eggs average 39·7 × 31·1 mm.: maxima **44·6** × 32·7 and 41·0 × **33·0** mm.; minima **35·1** × 30·0 and 35·2 × **29·5** mm.

Habits. The Short-eared Owl is much more diurnal than the Long-eared Owl and, unlike that bird, is found almost always on wide open spaces, such as heather-covered hills and uplands or grassy wastes. In India when seen it is nearly always put up by shooting parties when beating for game, and I have often seen it in Winter when beating with elephants for hog-deer on the

plains of Assam, and have even turned it out of dense ekra over ten feet high when buffalo shooting. It flies well by day and when hungry will sometimes hunt for food during the day time. It eats all sorts of small birds and mammals but probably field-mice and similar items form the greater part of its diet. In India some I examined had fed entirely on the largest grasshoppers and locusts.

Genus STRIX.

Strix Linn., Syst. Nat., 10th ed., i, p. 92 (1758).

Type, *Strix aluco* Linn.

As already noted the name *Strix*, which has hitherto been used as the generic name for the Barn-Owls, was first given to the Tawny Owl and must therefore be so employed, whilst *Syrnium* becomes a synonym. In this genus there are no aigrettes; the ear is furnished with an operculum; bill stout; the ruff is narrow and interrupted above but the facial disk is well developed; the tarsus is thickly feathered throughout and is strong with strong claws; the wings are short and rounded, the 3rd, 4th and 5th primaries subequal; tail moderate and round; irides always dark, not yellow.

The genus is represented over the greater part of the world, six species being represented in India.

Key to Species.

A. Lower plumage with longitudinal streaks and transverse bars.	
a. Upper plumage streaked as well as barred..	*S. aluco*, p. 396.
b. Upper plumage not streaked but barred only.	*S. nivicola*, p. 398.
B. Lower surface with bars only.	
c. No dark brown patch running back from the eye.	
a'. Bars on abdomen narrow, less than $\frac{1}{4}$ in. apart	*S. indranee*, p. 399.
b'. Bars on abdomen broad, more than $\frac{1}{4}$ in. apart	*S. seloputo*, p. 403.
d. A dark brown patch running back from the eye on either side of the neck	*S. ocellata*, p. 402.
C. Lower surface streaked only	*S. butleri*, p. 404.

Strix aluco.

Strix aluco Linn., Syst. Nat., 10th ed., i, p. 92 (1758).

Type-locality: Sweden.

The typical form, besides other differences, is a smaller bird an our Indian race.

(1644) Strix aluco biddulphi.

SCULLY'S WOOD-OWL.

Strix biddulphi Scully, Ibis, 1881, p. 423 (Gilgit).
Syrnium biddulphi. Blanf. & Oates, iii, p. 274.

Vernacular names. None recorded.

Description. Disk white in front with black bristly shafts; posteriorly barred brown and white with black shafts; feathers over the eye running into a supercilium behind it mottled with white; whole upper surface pale grey-brown with dark brown longitudinal streaks, broad on the head, neck and upper back and scapulars, more narrow on rump and obsolete on upper tail-coverts; every feather vermiculated outside the streaks with wavy whitish bars, broader on the back, very fine on the rump; scapulars with bold white patches on the outer webs; wing-coverts and inner secondaries like the back, the outer coverts with bold white subterminal patches on the outer webs; primary coverts banded alternately with brown and with vermiculated brown and grey; primaries dark brown, the first barred with mottled fulvous-grey on the outer webs, the others with broad bands on both webs, the outer more fulvous and less mottled, the inner duller and more vermiculated; central tail-feathers dull pale grey vermiculated with dull brown all over; lateral tail-feathers barred brown and dull fulvous-grey, the pair next the centre with vermiculations on the outer webs; in fresh plumage all the tail-feathers are narrowly tipped whitish; whole lower plumage white, closely barred on chin and throat with dark brown and with black central streaks on the fore-neck; remainder of breast, abdomen, etc. streaked with dark brown and with narrow cross-bars of the same; vent, leg-feathers and under tail-coverts with bars only and no central streaks.

Colours of soft parts. Iris dark brown; bill green, yellow at the tip, cere olive; toe-scales pale green, claws black, slaty at the base (*Scully*).

Measurements. Wing 285 to 335 mm.; tail 191 to 210 mm.; tarsus 50 to 51 mm.; culmen about 33 to 35 mm.

Distribution. Scully obtained his specimens in Gilgit, and Hume obtained one from Peshawar and one from Murdan. Whitehead also obtained two other birds at Kohat in January 1906 and March 1908 at 1,700 and 2,500 feet respectively. Ward has obtained several specimens in Kashmir and most probably every record of the occurrence of *nivicola* in Kashmir refers to this bird.

Nidification. Ward has taken eggs from March to May, these being laid in hollows under large rocks or between boulders in rocky ravines on the bare ground with no nest. Two eggs seem to be the normal clutch and five average 56·6 × 43·3 mm.: maxima **53·1** × 45·5 and 52·3 × **46·0** mm.: minima **48·0** × **41·0** mm. It is almost sure sometimes to breed in holes in trees.

Habits. This Wood-Owl seems to be found in small numbers over the greater part of Kashmir and Ward says that "it is not uncommon" in some places, but that it is very nocturnal in its habits and seldom seen. Some specimens obtained by him were in forest which was very rocky and broken up by ravines.

(1645) Strix nivicola.

THE HIMALAYAN WOOD-OWL.

Syrnium nivicolum, Blyth, J. A. S. B., xiv, p. 185 (1845) (Himalayas).
Syrnium nivicola. Blanf. & Oates, iii, p. 273.

Vernacular names. *Kashi-op tak-pum* (Lepcha); *Uko* (Bhut.).

Description. Superficially very like *S. a. biddulphi* but very much darker above, the general ground tone being dark brown rather than pale grey; there *are no longitudinal streaks* on the upper back, the dark markings being all of the nature of bars; the central tail-feathers though more vermiculated on the edges than the lateral ones are just as boldly barred as are the tails of *S. a. biddulphi*; below the markings, both longitudinal and barred, are bolder and darker.

There are two distinct types of plumage in this Owl; in the North-West birds the colour above may be said to be dark brown with but little rufous tinge and that practically confined to the hind neck. In birds from Nepal East to Assam the general tone above is a rich rufous tint whilst below the white is almost entirely replaced with rufous-fulvous, rich on the breast, paler elsewhere.

Colours of soft parts. Iris dark brown; bill pale fleshy-yellow, cere brown; ends of toes plumbeous, claws brown.

Measurements. Wing 282 to 312 mm.; tail 168 to 175 mm; tarsus about 45 to 48 mm.; culmen about 22 to 24 mm.

Young birds are marked above with narrow whitish, or fulvous, and broad dark brown bars, and below are barred throughout with equally broad bars of dull brown and pale or rich fulvous; the tails and wings are as in the adult.

Distribution. The Himalayas from Murree to Eastern Assam, North of the Brahmaputra, Shan States, Yunnan, China to Pekin.

It is very doubtful whether this race should not be further split up into two but, as there are two grey specimens from "North Bengal" (? Darjeeling) among the many rufous birds from Sikkim and Darjeeling, I refrain for the present from doing so.

Nidification. This Owl breeds from January (Mussoorie) to April (Simla), laying two or three eggs either in holes in trees or under a boulder on the ground, but the former most often. Jones found one clutch of three eggs in a large natural hollow in an oak-tree thirty feet from the ground and other clutches nearly as high

up. Fifteen eggs average 48·2×41·6 mm.: maxima **48·9**×41·0 and 48·4×**42·0** mm.; minima **45·8**×41·1 and 48·2×**39·4** mm.

Habits. The Himalayan Wood-Owl is a forest bird, preferring those which are broken and rocky. It is essentially a nocturnal Owl, not coming into the open until night has fallen; consequently it has been but little observed and there is nothing on record about its habits. The note is a not unpleasant double hoot but it also has a considerable vocabulary of cat-calls etc., none, however, so unpleasant as those of some other Owls.

Strix indranee.

Key to Subspecies.

A. Smaller; wing under 370 mm.
  a. Generally much paler ..... *S. i. indrance*, p. 399.
  b. Generally much darker ..... *S. i. maingayi*, p. 401.
B. Larger; wing over 380 mm. ..... *S. i. newarensis*, p. 400.

(1646) Strix indranee indranee.

THE BROWN WOOD-OWL.

Strix indranee Sykes, P. Z. S., 1832, p. 62 (Deccan).
Syrnium indrani. Blanf. & Oates, iii, p. 275 (part).

Vernacular names. *Ulama* (Cing.).

Description. Bristly loral feathers black with white edges; feathers round the eye black, passing into pale fulvous to dull rufous on the disk, often faintly barred with brown (probably young birds); a white eyebrow meeting across the forehead and sometimes running back as a supercilium; ruff dark chocolate-brown; upper parts chocolate-brown, a little darker on the crown, generally darker than the back, with obsolete deeper edges; scapulars and wing paler brown, the former boldly, the latter faintly barred with white; primary coverts dark chocolate barred with dull greyish; quills dark brown, the first primary immaculate, the second faintly barred with rufous and each succeeding feather more and more barred, the innermost secondaries being light brown, barred with fulvous-grey and tipped with white; rump and upper tail-coverts brown, barred with paler fulvous or whitish-brown; tail brown, barred with greyish or fulvous-white and tipped white; chin mixed chocolate and white; a patch on the throat almost pure white; remainder of lower plumage pale fulvous or whitish-buff, closely barred with dark brown, often much suffused with brown on the upper breast; axillaries and under wing-coverts barred brown and buff.

Colours of soft parts. Iris brown, rarely golden yellow; bill greenish-horny, bluish near the base, the cere plumbeous; toes pale leaden; claws dusky plumbeous, paler at their bases.

Measurements. Wing 291 to 348 mm.; tail 186 to 195 mm.; tarsus about 50 to 57 mm.; culmen about 48 to 50 mm.

Young birds have white fringes to the feathers of the head and back; the underparts are white, faintly barred with pale rufous; the wing-coverts are pale dull rufous, barred with pale buff and very broadly tipped with white.

Distribution. Ceylon and South India, North to Mahableshwar. It has also been obtained at Goomsur and in the Shevaroy Hills, and Sykes's bird was found in the Deccan.

Nidification. Bourdillon obtained the eggs of this bird in Travancore in January and also took a single egg, probably a second laying, on the 1st March from the same place. The eggs were laid on a rough nest of sticks and rubbish, apparently collected by some other bird, on a shelf of a rock in deciduous forest. In size they vary between $49{\cdot}5 \times 40{\cdot}3$ and $52{\cdot}2 \times 43{\cdot}1$ mm. In Ceylon it is said to breed from February to March.

Habits. In Malabar and Travancore this fine Owl seems to be found from the lowest to the highest hills and in Ceylon is common from sea-level up to that of Nuwara Eliya, about 6,000 feet. It is a bird both of forests and well-wooded country and moves about a good deal during the daytime, when it is always well mobbed by small birds. All kinds of weird cries, especially those of the "Devil-Bird," have been attributed to this Owl, though it is more likely to be *Phodilus b. assimilis* which is really responsible. Its ordinary call is a low call of four syllables, according to Wait sounding like "Oot-oot-tu-whoo," the first two notes only to be heard close at hand. These Owls devour small animals and birds, reptiles of all kinds and are said to be very partial to fish. Their flight is fast and powerful though silent.

(1647) Strix indranee newarensis.

THE HIMALAYAN BROWN WOOD-OWL.

Ulula newarensis Hodgs., As. Res., xix, p. 168 (1836) (Nepal).
Syrnium indrani. Blanf. & Oates, iii, p. 275 (part).

Vernacular names. *Bulaka* (Nepal); *Mik-dab-bru* (Lepcha).

Description. Differs from the preceding bird in having the facial disk whitish or only faintly fulvous; the eyebrow is a purer white; the bands on the tail-feathers are generally more white and the lower parts are less fulvous, more white.

Colours of soft parts as in the other races.

Measurements. Wing 382 to 412 mm.; tail 229 to 335 mm.; tarsus about 53 to 56 mm.; culmen about 40 to 45 mm.

Distribution. Throughout the Himalayas from the extreme West to the extreme East. It is also found throughout the hills of Northern and Central Burma and Northern Siam but where it meets the next race is not known. Birds from Anhei and Eastern

China seem to be very dull and dark above with darker brown bars below. An Annam bird is attributed to this subspecies by Robinson and a Formosan bird also seems indistinguishable from it.

Nidification. W. P. Masson found this magnificent Owl breeding in caves in cliffs below Darjeeling during February, whilst in Assam I took eggs in March. Whymper took eggs in Kuman and Naini Tal in February, March and April. The eggs appear to be always laid on the ground with no pretence at a nest either in a cave, a hollow scratched at the foot of a cliff or, less often, in a hollow at the foot of some cliff-growing tree. The normal clutch of eggs is two but occasionally only one is laid. In shape these are very broad oval or what Hume termed subspheroidal. Sixteen average 56·2 × 45·9 mm.: maxima **58·3 × 49·1** mm.; minima **49·4 × 41·2** mm. Incubation took exactly thirty days in the only case known to me for certain. I found this egg on the 3rd March but left it as I wanted the pair. Then having to leave I did not again return until the 3rd April, when the two young had just emerged from the shell.

They breed, so far as is known, from about 2,500 feet up to 7,000 or 8,000 feet, most often between 3,000 and 5,000 feet.

Habits. Much the same as those of the preceding race but it never apparently visits the plains, whilst, on the other hand, it has been found up to 13,000 feet in Sikkim. During the day-time it keeps almost entirely to deep forest but wanders forth in the evening into more open parts, especially places like wide glades, stream-side openings, etc. It is a bold, fierce bird and preys not only on the smaller birds and mammals but on others much larger, such as pheasants, jungle-fowl, the larger squirrels and small monitor lizards. Bamboo-Partridges and those of the genus *Aboricola* seem constantly to fall victims to it, being seized from their perches in bamboos and trees. Its note is a deep call of four syllables but they are quite distinct and never resemble the deep guttural conversations of *Huhua*.

(1648) Strix indranee maingayi.

THE MALAY BROWN WOOD-OWL.

Syrnium maingayi Hume, Str. Feath., vi, p. 29 (1878) (Malacca).
Syrnium indrani. Blanf. & Oates, iii, p. 275 (part).

Vernacular names. None recorded.

Description. This race is a deeper, richer colour than either of the two preceding forms; the facial disk is a rich rufous; the chocolate ruff almost black; the upper plumage very rich and dark, the crown and nape notably darker than the back; the lower plumage is a darker fulvous; the dark chin-patch extends on to the throat; the white throat-patch is whiter and more vivid

and the breast much more suffused with chocolate, sometimes appearing almost wholly a chocolate-brown.

Colours of soft parts. Iris brown; bill whitish; toes "pepper"-colour (*Herbert*).

Measurements. Wing 335 to 338 mm.; tail 181 to 210 mm.; tarsus about 58 to 60 mm.; culmen about 36 to 39 mm.

Distribution. Malay States. Specimens from Southern Burma, of which I have seen two, are very richly coloured and must be placed with this race. It probably only occurs in South Tenasserim. Herbert's birds from South-West Siam are certainly of this race.

Nidification. Nothing recorded.

Habits. As far as are known similar to those of the two preceding races. Davison syllabifies the call as "hoo—hoo—hoo—hoo."

(1649) Strix ocellata.

THE MOTTLED WOOD-OWL.

Syrnium ocellatum Less., Rev. Zool., 1839, p. 289 (Pondicherry); Blanf. & Oates, iii, p. 277.

Vernacular names. None recorded.

Fig. 67.—Head of *S. ocellata*. ½.

Description. A stripe running vertically behind the eye rufous; lores and remainder of disk white, with subapical black spots and terminal black bristles; ruff white and black, the feathers edged chocolate; upper parts ferruginous-brown with black ends, the head, nape and neck spotted with white, the spots as they pass on to the back, scapulars, wing-coverts, rump and upper tail-coverts becoming gradually larger and increasingly vermiculated with black; visible portions of wing-quills and all outer coverts vermiculated black and white with broader bars of black or dark brown and the innermost secondaries and scapulars with dark central lines also; bases of primaries and outer secondaries buff on the inner web and barred dark brown and mottled brown on the

terminal halves; tail barred narrowly with dark brown, broadly with mottled bars of brown and white and very rufous at the base, the outer tail-feathers much more buff at the base; chin white; centre of throat-feathers chestnut and black tipped with white; a large patch of white on the fore-neck; lower parts white with narrow bars of black and patchily tinged with golden-buff, deepest on the breast and round the white patch; axillaries and under wing-coverts like the abdomen.

Colours of soft parts. Iris dusky brown; eyelids orange; bill black; toes dark greenish-brown, soles paler and more yellow, claws dusky.

Measurements. Wing 320 to 345 mm.; tail 174 to 201 mm.; tarsus 54 to 56 mm.; culmen 36 to 39 mm.; the smallest and the largest measurements are both of males.

Distribution. India, South to the Carnatic and to the base of the Nilgiris; North to the Himalayas and East to Lower Bengal.

Nidification. In the Central Provinces and the Bombay Presidency the Mottled Wood-Owl lays from December to February and in Northern India, the United Provinces, Bihar and Bengal from February to April. The eggs are deposited in large natural holes in trees, or sometimes in the hollows between two or more of the larger limbs. In no case is there any nest, though there may be a considerable accumulation of dead leaves and other rubbish. The full clutch of eggs is two but one only is often laid. Eighteen eggs average 51·1 × 42·0 mm.: maxima **54·3** × 42·1 mm. and 53·2 × **44·2** mm.; minima **48·2** × **41·0** mm.

Habits. This Wood-Owl may be found in almost any well-wooded country but in most parts of India mango-groves seem to be its favourite resort. It is more exclusively a rat and mouse destroyer than any of the other Wood-Owls and also kills a large number of the little striped squirrels. Its call is a loud single hoot but it also has a chuckling conversational series of notes and occasionally, perhaps in the breeding-season only, utters a screaming call.

(1650) Strix seloputo.

THE MALAYAN WOOD-OWL.

Strix seloputo Horsf., Trans. Linn. Soc., xiii, p. 140 (1821) (Java).
Syrnium seloputo. Blanf. & Oates, iii, p. 278.

Vernacular names. None recorded.

Description. Whole facial disk rufous, palest below; edge of ruff dark chocolate-brown; upper parts chocolate-brown, almost black on the head and neck and gradually changing to light almost rufous-chocolate on the rump and upper tail-coverts; head and neck spotted with white, the edges of the spots black, these spots widen until on the upper tail-coverts they are regular bars; outer scapulars mostly white with bars of chocolate; wing-coverts

like the back but less spotted, except on the greater and outer coverts, where the spots become large patches vermiculated with chocolate near the tips; primaries dark brown, edged paler and with broad rufous bands at the base of the inner webs, the bars gradually increasing in extent until the inner secondaries are chocolate, banded on the outer webs with broken white and on the inner with broader fulvous bars; central tail-feathers light chocolate with obsolete paler bars and tips, lateral feathers with broad pale bars, margined above and below with darker chocolate; chin pale buff; fore-neck and throat white; remainder of lower surface white, deeply suffused with rufous on the breast, lightly so elsewhere and everywhere banded with deep chocolate, the bars widest and closest on the breast, most narrow and wide apart on the abdomen and under tail-coverts.

Colours of soft parts. Iris dark brown; bill and cere greenish-black to black; feet grey or "horny" (*Davison*).

Measurements. Wing 347 to 376 mm.; tail 188 to 198 mm.; tarsus 59 to 60 mm.; culmen, ♂ 39 to 42 mm., ♀ 43 to 45 mm.

Distribution. South Burma, from Pegu, through the Malay States to Java, Sumatra and Borneo; East it extends to Siam and Cochin China.

Nidification. A single egg taken by Herbert on the 23rd February near Samkok in Siam measures 49·0 × 41·0 mm.

Habits. Davison records that this is an Owl of the forests, coming into the more open parts to feed soon after dusk. Those examined contained nothing but the remains of large beetles. The call is described as different to that of any other Wood-Owl. "It commences with a rolling 'hoo-hoo-hoo' and ends with a prolonged and deep drawn 'hoo'."

(1651) Strix butleri.

HUME'S WOOD-OWL.

Asio butleri Hume, Str. Feath., vii, p. 316 (1878) (Omara, Mekran Coast).
Syrnium butleri. Blanf. & Oates, iii, p. 279.

Vernacular names. None recorded.

Description. Disk white in front, fulvous below and behind the eye; ruff grey-brown, edged darker; upper plumage dingy pale buff, browner on the rump, upper tail-coverts and scapulars, barred with darker dull brown; tail-feathers dull grey-brown, the central tail-feathers with fulvous-grey spots along the shaft which become bands on the lateral feathers; scapulars with indistinct dark streaks, the outer with dull white patches edged darker; coverts pale dull brown, the greater and a few of the median with terminal white patches, edged darker; quills barred brown and pinkish grey-brown; chin white and a patch of white on the

fore-neck; remainder of surface creamy-white with buff tips and dark shaft-lines on the flanks and breast; under wing-coverts and axillaries white with brown bars showing through.

Colours of soft parts not recorded.

Measurements. Wing 257 mm.; tail 144 mm.; tarsus 57 mm.; culmen 28 mm.

Distribution. Only two specimens known, the type from Omara and a second obtained by Tristram on Mt. Sinai.

If more material is obtained it will be possible to place this Owl in its proper position. Its small feet and slender long legs at once separate it from *Strix* (*Syrnium* auct.) and it has no aigrettes like *Asio*, besides disagreeing with that genus in other respects.

Nidification and **Habits.** Nothing recorded.

Subfamily BUBONINÆ.

Ear-orifice not exceeding the eye in size, no operculum; facial disk generally ill-marked and never extending as far above eye as below; ruff absent or obsolete.

Key to Genera.

A. Aigrettes well developed.
  a. Wings exceeding 300 mm.
    a'. Tarsus partly or wholly naked ..... KETUPA, p. 405.
    b'. Tarsus feathered throughout.
      a''. First quill longer than seventh; iris yellow ..... BUBO, p. 412.
      b''. First quill shorter than tenth; iris brown ..... HUHUA, p. 417.
  b. Wing under 250 mm. ..... OTUS, p. 421.
B. Aigrettes small or absent.
  c. Cere not inflated; colour mainly or wholly white ..... NYCTEA, p. 420.
  d. Cere inflated; colour brown or rufous.
    c'. Plumage more or less spotted with white above ..... ATHENE, p. 438.
    d'. Plumage barred above..... GLAUCIDIUM, p. 443.
    e'. Plumage uniform above ..... NINOX, p. 453.

Genus KETUPA.

Ketupa Lesson, Traité d'Orn., p. 114 (1831).

Type, *Ketupa javanensis* Horsf. = *Ketupa ketupa* Horsf.

Aigrettes long and pointed; bill powerful and long; facial disk not well developed, especially above; tarsus wholly naked and granular, the soles of the feet covered with sharp-edged scales; claws large, well curved, each with a sharp cutting-edge beneath and the middle claw with a sharp keel on the inside also; the

wings are comparatively short and rounded, the third, fourth and fifth primaries subequal, but the fourth generally slightly the longest.

Key to Species.

A. Tarsus naked behind and only feathered about one-third down in front.
  a. Lower surface with dark shaft-stripes as well as fine bars ..... *K. zeylonensis*, p. 406.
  b. Lower surface with shaft-stripes only and no bars ..... *K. ketupu*, p. 410.
B. Tarsus feathered about one-third behind and more than halfway down in front ..... *K. flavipes*, p. 411.

Ketupa zeylonensis.

Key to Subspecies.

A. Rather small and dark rufous-brown; wing 355 to 406 mm. ..... *K. z. zeylonensis*, p. 406.
B. Larger and paler rufous-brown; wing 400 to 448 mm..... *K. z. hardwickii*, p. 408.
C. Larger and paler than A, darker and browner than B ..... *K. z. leschenault*, p. 409.
D. Palest and most rufous of all the races .. *K. z. semenowi*, p. 409.

(1652) Ketupa zeylonensis zeylonensis.

THE CEYLON BROWN FISH-OWL.

Strix zeylonensis Gmelin, Syst. Nat., i, p. 287 (1788) (Ceylon).
Ketupa zeylonensis Blanf. & Oates, iii. p. 281 (part).

Vernacular names. *Bakamuna* (Cing.).

Description. Bristly feathers of lores and ear-coverts fulvous, shafts and terminal bristles black except at the base; upper plumage rufous-brown, each feather with a broad black shaft and with the edges of the neck-feathers more or less faintly barred with pale brown; lower back, rump and upper tail-coverts paler with more narrow shaft-lines; scapulars much mottled on the inner webs and with the outer webs white, mottled at the edge in broken bars with pale rufous-brown; wing-coverts dark brown, the inner coverts paler on the outer webs, much mottled and with indistinct pale spots; the outer coverts with bolder bars and spots of white and pale fulvous; primaries brown with pale rufous bars on the outer webs and mottled bars of pale brown on the inner webs; secondaries barred with mottled pale fulvous on both webs, the innermost secondaries like the scapulars but with no white; tail dark brown with narrow bars and tips of fulvous, generally much mottled with brown; a large patch of white on the throat and fore-neck; remainder of lower parts very pale fulvous, darker on the breast and flanks, everywhere narrowly cross-barred with

rufous-brown and with long shaft-streaks of blackish-brown; the feathers of the white throat-patch have short terminal streaks of black with rufescent edges; under wing-coverts and axillaries mixed rufous, brown and white.

Colours of soft parts. Iris bright golden-yellow; bill dull greenish-yellow, the base and basal half of the culmen darker; cere pale dusky green; legs dusky yellow, greenish-yellow or plumbeous yellow.

Fig. 68.—Left foot of *K. z. zeylonensis*. $\frac{1}{2}$.

Measurements. Wing 355 to 406 mm.; tail 175 to 206 mm.; tarsus 85 to 90 mm.; culmen 42 to 48 mm.

Young birds are much more rufescent above, the shaft-streaks more narrow; below, the plumage is paler and duller and the streaks less broad and conspicuous. Birds in the second year are duller and paler than birds in their third year.

Distribution. Ceylon, Travancore, Malabar, Mysore to the summit of the Nilgiri, Palni and Nelliampatty Hills, North to about the latitude of Bombay City and on the East to about the mouth of the Krishna River.

Nidification. This Fish-Owl breeds in Ceylon in June, July and August but in its more Northern habitat from December to March, most eggs being laid in January and February. It deposits its eggs on ledges of cliffs, holes in banks and trees, in the hollows formed by the branching of two or more boughs or in the unused nests of eagles and other birds. When placed in holes there is no nest but when on ledges a few sticks and oddments are

gathered together whilst old nests are said to be relined and added to. Holes and hollows in Mango, Banyan and Pepul trees seem to be favourite sites. Generally two eggs are laid, sometimes one only and the few I have been able to measure average about 58·7 × 47·3 mm.

Habits. The Ceylon Fish-Owls haunt both forest and open but well-wooded country but it seems essential that water should be close by, as their food consists mainly of fish, frogs, water-beetles, etc. They are, however, not at all conservative in their diet and, failing fish, will eat small mammals, birds as large as pheasants, snakes, lizards and insects and Inglis found a pair feeding on the carcase of an alligator he had shot the previous day. They commence to feed fairly early in the evenings before small birds have gone to roost and deservedly suffer considerable mobbing by these latter. Their flight, though it appears rather laboured as they flap along, is very swift and powerful and as silent as that of all other Owls. Their call is a deep treble note which has been likened to "Gloom-oh-gloom" and in addition they give vent to groans of displeasure and to low chucklings when feeding their young.

(1653) Ketupa zeylonensis hardwickii.

THE NORTHERN BROWN FISH-OWL.

Strix hardwickii Gray in Hardw. Ill. Ind. Zool., ii, pl. 31 (1834) (Futteghur).
Ketupa zeylonensis. Blanf. & Oates, iii, p. 281 (part).

Vernacular names. *Amrai-ka-ghughu, Ulu* (Hind.).

Description. Larger, much more and much paler rufous above and not so dark on the stripes, which are brownish rather than black and also less broad; the scapulars and wing-coverts are more marked with white and the quills are more boldly marked with paler, whiter markings; below they are generally whiter and paler though some specimens are strongly washed with rufous, but in these the rufous is more pink and less brown than it is in *K. z. zeylonensis.*

Colours of soft parts as in the other races.

Measurements. Wing 400 to 448 mm.; tail 194 to 220 mm.; culmen 45 to 50 mm.

Distribution. All Northern and North-West India except Sind and Baluchistan, South to the area occupied by the previous bird; East to (but not including) Bengal, Nepal, Sikkim and Bhutan. Possibly birds from Assam North of the Brahmaputra may prove to be of this race also. I cannot separate this form from Hodgson's *nigripes* named in 1836 from Nepal.

Nidification. Similar to that of the preceding race. The breeding-season is from January to March, a few eggs being laid as early as December.

Habits. Those of the species. It does not ascend the Himalayas to any height, being seldom found above 3,000 feet.

(1654) Ketupa zeylonensis leschenault.

THE BENGAL BROWN FISH-OWL.

Strix leschenault Temm., Pl. Col., pl. 20 (1824) (Chandernagore).
Ketupa zeylonensis. Blanf. & Oates, iii, p. 281 (part).

Vernacular names. *Amrai-ka-ghughu* (Hind.); *Bhutum* (Beng.); *Hudu* (Assam); *Tee-dote* (Burm.).

Description. Paler and larger than *K. z. zeylonensis* and in depth of rufous tint intermediate between that bird and *hardwickii*, but darker and browner.

Colours of soft parts as in the other races.

Measurements. Wing 378 to 412 mm.

Distribution. Bengal, Orissa, Assam, Manipur, Burma.

Nidification. The Bengal Fish-Owl breeds in Eastern Bengal from November to January but in Burma Hopwood took eggs as late as the 15th February. The sites selected for their eggs are much the same as those chosen by the other races but in Dacca I found them breeding in the broken-down mausoleums round about the numerous tanks on the racecourse. The eggs were laid on the platforms under the roofs with no pretence at a nest but nearly always a mass of pellets and very unsavoury remains formed a bed for the young ones.

Habits. Those of the species. One pair, whose eggs I took, had evidently been feeding regularly on the tame pigeons kept in numbers by the Nawab of Dacca, whose palace was only a few hundred yards away. In the pellets of many of these Owls I noticed frequently remains of large beetles. They are, very loquacious birds, but not noisy, their deep guttural notes being uttered continuously during the breeding-season.

(1655) Ketupa zeylonensis semenowi.

THE ARABISTAN BROWN FISH-OWL.

Ketupa semenowi Sarudny, Orn. Jahrb., xvi, p. 141 (1905) (Arabistan).

Vernacular names. *Gug* (Sind).

Description. A very pale, bright rufous bird compared with any of the other races; the streaks on the upper and lower plumage are comparatively narrow; the bars on the wings and tail are broader and paler; the scapulars and wing-coverts are much marked with pinkish-rufous and the former are more marked in some cases with white.

Colours of soft parts as in the other races.

Measurements. Wing 415 to 434 mm.

Distribution. Persia and Mesopotamia to Palestine (*Hartert*), Baluchistan and Sind.

Nidification. Nothing recorded.

Habits. Apparently very similar to those of the other species. This bird is said, during the day, to haunt huge solitary trees which have dense foliage and to sit very close, refusing to leave its shelter unless absolutely forced to do so.

(1656) Ketupa ketupu.

THE MALAY FISH-OWL.

Strix ketupu Horsf., Trans. Linn. Soc., xiii, p. 141 (1821) (Java).
Ketupa javanensis. Blanf. & Oates, iii, p. 283.

Vernacular names. *Didok* (Burma); *Dao-bu-gao* (Cachari).

Description. Lores, cheeks and ear-coverts fulvous-white to rufous, with black shafts; upper plumage blackish-brown, each feather broadly edged with rufous and, except on the head and neck, with a pale rufous spot near the tip, half on the rufous, half on the black; outer scapulars white or fulvous on the outer webs but not showing very conspicuously; wing-coverts like the back but with much larger spots; tail dark brown with whitish tips and three or four whitish bars; lower plumage rufous-buff, varying considerably in intensity, streaked throughout with narrow dark brown shaft-stripes, broadest and most numerous on the breast and upper flanks, few in number on the abdomen, vent and under tail-coverts, absent on the thigh-coverts; a whitish patch on the throat, always small, often absent.

Colours of soft parts. Irides yellow to golden-yellow; bill horny-brown, paler and yellowish at extreme tip; cere slaty-blue or plumbeous; legs and feet dusky yellowish-brown to dingy greenish.

Measurements. Wing 320 to 390 mm., the great majority being between 335 and 370 mm.; tail 160 to 181 mm.; tarsus 70 to 80 mm.; culmen 40 to 42 mm.

Young are much more rufous than the adults, less marked with white spots above and with the dark streaks narrower; the tail has five to six narrow whitish bands; the feathers of the lower parts are cross-rayed faintly with darker and have the streaks very narrow.

Distribution. Tenasserim, Malay Peninsula, Java, Sumatra and Borneo; East to Siam and Cochin China. It occurs in Northern Burma in Arakan; I found it not very rare in the hills of South Assam and Coltart obtained one specimen in Dibrugarh.

Nidification. Kellow found this Owl breeding in the foot-hills behind Perak. The eggs were laid either in caves in the cliffs or in hollows where the first great boughs spring from the trunks of

forest trees. In one instance three eggs were found, in the others two. They were laid in January and February. In the latter month Coltart and I obtained eggs in the Khasia Hills and North Cachar and he also had bird and eggs brought in to him in March in Dibrugarh. The eggs measure between 51·0 × 43·0 and 57·2 × 44·0 mm. and are strikingly smaller than those of *K. flavipes*.

Habits. Nothing on record beyond Davison's notes in 'Stray Feathers.' He observes that it is a very shy bird, as fully alert by day as by night and that it feeds almost entirely on insects. In the Assam Hills it is always found in forest by streams, but it took to flight much quicker than *Ketupa flavipes*, which occurred in the same forests and which was not nearly so wide-awake in the daytime. Davison describes its call as a soft, musical "to-wee to-wee," in addition to which it has a low, querulous one. In the pellets examined by myself I found little but remains of enormous beetles except a few tiny bones of, I believe, field-mice. There were no bird-remains near the nest but there were remains of two bats in one nest.

(1657) Ketupa flavipes.

THE TAWNY FISH-OWL.

Cultrunguis flavipes Hodgs., J. A. S. B., v, p. 364 (1836) (Nepal).
Ketupa flavipes. Blanf. & Oates, iii, p. 282.

Vernacular names. *Lak-kyo-o-mung* (the Kyo-o-calling devil) (Lepcha); *Dao-hac-ho-ho*, *Dao-bu-gao* (Cachari).

Description. In general appearance very like *Ketupa ketupu* but above much richer in colour, almost orange-rufous, the central dark markings broader and the spots concolorous with the rufous edges; below, the rufous is very deep and rich and the dark red-brown streaks broader and more numerous; the white patch on the throat is generally much better developed.

Colours of soft parts. Iris yellow; bill horny-black, sometimes a little yellowish at extreme tip; cere dingy green; legs yellowish-grey, dingy greenish or slaty-green; claws horny-black; the tarsi are feathered for about two-thirds their length in front and at the sides and also for about one-third behind.

Measurements. Wing 410 to 455 mm.; tail 215 to 227 mm.; tarsus 60 to 67 mm.; culmen about 48 to 50 mm.

Young birds are like those of *K. ketupu* but more richly coloured and of course much bigger.

Distribution. The Himalayas from Kashmir to East and South Assam, Manipur, Lushai Hills and West China.

Nidification. Similar to that of the preceding bird but it prefers old nests of Eagles in which to deposit its eggs. These nests it does not repair, nor does it add any lining and when

it lays its eggs in caves they are dropped on the bare earth. Eggs in my collection vary between 56·0×45·3 and 58·8×48·3 mm.; the breeding-season is from November to February.

Habits. In Assam this is almost exclusively a forest Owl, though it will always be found haunting the banks of streams. It is the most powerful and savage of all the species of *Ketupa* and frequently kills jungle-fowl, pheasants and wood-partridges, though for the most part feeding on fish, crabs, lizards and large coleoptera. I have frequently found remains of bamboo-rats about their nests and once remains of a small porcupine. It is a diurnal Owl, even hunting game by daylight but it is sluggish until the later afternoon and when disturbed often prefers to sit still and be watched rather than take to wing. The chief note I have heard is a deep "whoo-hoo" but a wounded bird makes a loud screeching and hoarse growls, and this bird, like the rest of the genus, has a curious mewing call very like that of a cat.

Genus **BUBO.**

Bubo Cuvier, Règne An., i, p. 331 (1817).

Type, *Bubo maximus* Fleming = *Bubo bubo* Linn.

This genus differs from *Ketupa* principally in having the tarsus fully feathered; the feet are exceptionally powerful, the claws well curved with the inner, or second, claw longest; the third primary is longest, or the third and fourth subequal; tail moderate and slightly rounded.

The genus has representatives over the greater part of the world except Australia.

Key to Species.

A. General colour buff and blackish-brown .. *B. bubo*, p. 412.
B. General colour greyish-brown..... *B. coromandus*, p. 415.

Bubo bubo.

Strix bubo Linn., Syst. Nat., 10th ed., i, p. 92 (1758).

Type-locality: Sweden.

The typical form is much darker than our Indian races.

Key to Subspecies.

A. Wing 435 to 513 mm.; paler and more grey..... *B. b. turcomanus*, p. 413.
B. Wing 420 to 465 mm.; darker and more brown ..... *B. b. tibetanus*, p. 414.
C. Wing 370 to 433 mm.; darkest and most richly coloured ..... *B. b. bengalensis*, p. 414.

(1658) Bubo bubo turcomanus.

THE TURKESTAN GREAT HORNED OWL.

Strix turcomana Eversm., Add. Pall. Zoog. Rosso-As., i, p. 3 (1835) (Caspian Sea).
Bubo ignavus. Blanf. & Oates, iii, p. 284 (part).

Vernacular names. None recorded.

Description. Bristly feathers of lores and face white or fulvous with black shafts; ear-coverts and cheeks a fulvous-grey, also with black shafts; a narrow black rim to the facial disk; supercilium from the eye black; aigrettes black, the inner feathers with buff on both webs, the outer feathers with buff inner webs only; crown and nape black mottled with very pale fulvous, fulvous or rufous-fulvous; hind-neck with the black or dark brown confined to broad central streaks; remainder of upper plumage dark brown, mottled and barred with fulvous, varying much in depth of colour; rump and upper tail-coverts practically all fulvous with thin wavy bars of brown; tail fulvous mottled and barred with brown, heavily on the central pair, sparsely on the outermost; scapulars largely fulvous on the outer webs; wing-coverts like the back but with large terminal white spots on the outer webs of the outer coverts; primaries dark brown with fulvous bars, the latter mottled with brown on the inner webs and at the tips; innermost secondaries with bars of brown and fulvous, each mottled with the other's colour; chin and a patch on the throat white; remainder of lower surface fulvous-white to warm fulvous, the breast with broad, bold stripes of black and slight mottling of black towards the tip; on the abdomen the stripes get narrower and the mottlings assume the shape of bars until on the posterior abdomen, vent, under tail-coverts and thighs the streaks disappear and only narrow wavy bars of brown remain.

Colours of soft parts. Iris golden yellow; bill greenish-black, slaty-black to black; toes dull greenish, the claws greenish-slate, darker at the tips.

Measurements. Wing 435 to 513 mm.; tail 260 to 310 mm.; tarsus 77 to 81 mm.; culmen 45 to 47 mm.

Distribution. Transcaspia, Turkestan, Persia, Baluchistan, Himalayas.

Nidification. Nothing recorded. A pair of eggs sent me from Gilgit as those of *B. b. bengalensis* are almost certainly of this race and are much larger than those of *B. b. bengalensis* measuring 58·9×47·3 and 58·0×48·5 mm. They were said to have been taken from a hole between two rocks on a rocky hillside at about 8,000 feet on the 2nd March.

Habits. Nothing recorded.

(1659) Bubo bubo tibetanus.

THE TIBETAN GREAT HORNED OWL.

Bubo bubo tibetanus Bianchi, Bull. B. O. C., xvi, p. 69 (1906) (Chitra, Tibet).
Bubo ignavus. Blanf. & Oates, iii, p. 284 (part).

Vernacular names. *Ugpa* (Tibet).

Description. This bird differs from the preceding only in being a trifle darker and more brown, especially on the upper plumage.

Colours of soft parts as in *B. b. turcomanus.*

Measurements. Wing 420 to 465 mm.; culmen 42 to 45 mm.

Distribution. Sikkim, Tibet and Western China.

Nidification. Two eggs taken in Tibet in the second week in March were laid on the bare earth in a cave at the foot of a high cliff. They measure 62·0×47·9 and 59·5×48·0 mm. A second clutch, said to have been taken from a similar situation, were too broken to measure accurately but both measured over 62·0× 50·0 mm.

Habits. The Tibetan Great Horned Owl seems to be a bird of the open plateaus and rocky hillsides, haunting holes in cliffs during the daytime and feeding principally on the Mouse-hares (*Lagomys*) and partridges (*Perdix hodgsoniæ*).

(1660) Bubo bubo bengalensis.

THE INDIAN GREAT HORNED OWL.

Otus bengalensis Frankl., P. Z. S., 1831, p. 115 (Bengal)
Bubo bengalensis. Blanf. & Oates, iii, p. 285.

Vernacular names. *Ghughu* (Hind.); *Ghubad* (Mahr.); *Yerra gudla guba* (Tel.); *Kotang* (Tam.); *Gug* (Sind).

Description. This is a small richly-coloured replica of *B. b. turcomanus,* the black blacker and the fulvous richer; the back and scapulars are less vermiculated and more definitely spotted with white; the tail is more plainly banded; the first primary is dark brown with mottled bars of fulvous on the outer web and two mottly bars of fulvous on the tip of the inner; the base of the inner web is fulvous and this colour increases in extent on the inner primaries, which also have the outer webs fulvous with narrow bars of brown.

Colours of soft parts. Iris golden to orange-yellow; bill horny, greenish or slaty-black; cere more green or slaty; toes, where uncovered with feathers, dingy green or greenish-slate, claws dusky black.

Measurements. Wing 370 to 433 mm.; tail 199 to 253 mm.; tarsus 67 to 72 mm.; culmen 39 to 43 mm.

There are two rather definite forms of this fine Owl, one in which the white spots on the upper plumage are few in number

and indistinct, and in this the broad dark mesial streaks on hind neck, back and scapulars are strongly developed; the other form is as described above. The two extremes are very great in their contrast but intermediate forms are common and there is no geographical distribution in which either is dominant over the other.

Distribution. Practically the whole of Northern India from an altitude of some 5,000 feet in the Himalayas to Rajputana, Khandesh in the Northern Bombay Presidency and the Deccan. On the West it has been obtained at Murdan, Sind, etc. and on the East it extends through Assam to Manipur and Arakan. It is with some doubt I retain the Kashmir birds in the same race as those from the plains of India. They average very decidedly bigger but, unfortunately, there is so much overlapping in size that it seems impossible to differentiate two races without any other characters to support that of average size.

Nidification. The Indian or Rock Horned Owl breeds from the end of November to the end of April, most birds laying in February. Betham took eggs as early as October near Poona, whilst Ward obtained an oviduct egg in May from a Kashmir bird. The eggs are laid on the ground, generally in a cave or on a ledge of a cliff, sometimes in nullahs and ravines, merely sheltered by shrubs or the roots of a tree. The usual number is three or four but two only are sometimes incubated and occasionally as many as five are laid. One hundred eggs from the plains average 53·6×43·8 mm.: maxima **57·2**×45·0 and 55·0×**45·3** mm.; minima **49·0**×42·0 and 51·0×**40·3** mm. Thirty Kashmir eggs average 57·5×45·9 mm. and run as big as **60·0**×**49·9** mm.

Habits. This fine Owl is very common in North and Central India as far East as Bihar and Chota Nagpore but is rarer in the dry and desert countries to the North-West and equally rare in the very humid districts of Eastern Bengal and Assam. Over most of its area it haunts ravines, rocky hills, cliffs, etc. but where these are not available it retires to orchards and groves of big, densely-foliaged trees such as Mangos. It is semi-diurnal in its habits, often feeding by day. It feeds on all sorts of small mammals and birds, lizards, snakes, frogs and large beetles and insects and will also catch and eat fish and crabs. Its ordinary call is a deep double hoot but it has a wide variety of growls, hisses and coughs with which it expresses fear or displeasure. It ascends the hills of Kashmir up to about 6,000 feet. Above this it has been frequently recorded but most of these references probably refer to *B. b. turcomanus*.

Bubo coromandus.

Key to Subspecies.

A. Paler, more grey ..... *B. c. coromandus*, p. 416.
B. Darker, more brown..... *B. c. klossi*, p. 417.

(1661) Bubo coromandus coromandus.

THE DUSKY HORNED OWL.

Strix coromanda Lath., Ind. Orn., i, p. 53 (1790) (Coromandel Coast).
Bubo coromandus. Blanf. & Oates, iii, p. 286 (part).

Vernacular names. *Gug* (Sind).

Description. Whole plumage very pale grey, with shaft-lines of dark brown, broad and indistinct above, more narrow and sharply defined below, vermiculated everywhere with tiny broken wavy bars of light brown; on the lower surface the brown is less extensive and the white shows up much more; the edge of the ruff and the greater part of the aigrettes are darker unmottled brown; the face is whitish with dark shafts; tail-feathers brown with white tips, the central feathers with broad bars of mottled brown and fulvous, the outer feathers with fulvous, less mottled bars; primaries dark brown, the outer with indistinct paler bars of mottled brown and fulvous, the inner with these bars much plainer.

Colours of soft parts. Iris yellow to deep yellow; bill greyish-white or pale lavender, the tip and culmen pale yellowish-horny; claws black (*Hume*).

Measurements. Wing 380 to 415 mm.; tail 205 to 210 mm.; tarsus 65 to 70 mm.; culmen 41 to 43 mm.

Distribution. The greater part of the Indian Peninsula. From Sind and the Punjab on the West to Western Bengal on the East; South it is found as far as Khandesh, Rajputana, Raipur, Mysore and the Carnatic. Specimens from Malacca and Arakan are far nearer Robinson's *B. c. klossi* from Siam and, until we get further material, must be placed with that race. A specimen said to have been obtained in Bengal seems to be a Malacca skin.

Nidification. The Dusky Horned Owl breeds throughout its range from late November until February, a few birds laying in March and early April. As a rule these Owls appropriate the deserted nest of some Eagle, but at other times construct their own nests or merely use the hollows between the branches of some big tree. They use the same site year after year and when they build their own nests they keep on adding sticks and lining to them so that they often assume huge dimensions. The eggs number two, occasionally one only, and forty average 59·3×48·2 mm.: maxima **62·4**×49·0 and 58·1×**49·2** mm.; minima **57·0**×**46·3** mm.

Habits. This Owl is almost as diurnal as crepuscular in its habits, feeding freely except during the brightest and hottest hours of the day. It frequents well-wooded areas where there is plenty of water and is not found in very arid or desert regions. They are fierce, vigorous birds and will tackle both animals and birds of some size but their principal food is crows, both the House-Crow

and the Jungle-Crow. They also eat frogs, lizards, snakes and, occasionally, fish and, during other birds' breeding-seasons, are great egg thieves. Bell found two dead porcupines in the nest of a pair of these birds. Their call is a low, deep rumbling "woo-woo-woo" and they also have a call that is loud and piercing but seems to be very seldom uttered.

(1662) Bubo coromandus klossi.

THE SIAM DUSKY HORNED OWL.

Bubo coromandus klossi Robinson, Journ. Fed. Malay S., p. 246 (1911).

Vernacular names. None recorded.

Description. Similar to the preceding bird but much darker; the head, back and scapulars are dark brown, without any vermiculations showing on the two latter and but little on the former; there is a pure white feather in each aigrette.

Colours of soft parts. Iris deep yellow; bill pale blue-grey; feet plumbeous grey (*Herbert*).

Measurements. Wing 390 to 393 mm.; tail 187 to 194 mm.; tarsus 66 to 67 mm.; culmen 44 to 45 mm.

Distribution. Siam?, Malacca, Tenasserim and Arakan. The range of this race is not yet determined but it is probable that all the records of *B. coromandus* in Burma refer to this bird.

Nidification. Unknown.

Habits. Similar to those of the preceding race.

Genus HUHUA.

Huhua Hodgs., As. Res., xix, p. 173 (1836).

Type, *Huhua nipalensis* Hodgs.

The genus is very close to *Bubo* but is distinguished by the very important character of its juvenile plumage, the young having a perfectly distinct plumage from which it moults into that of the adult. The wing is even more rounded than in *Bubo*, the fourth and fifth quills being longest; the inner claw is very large; the iris is brown, not yellow.

The genus contains two species, both occurring in India and both confined to the Oriental region.

Key to Species.

A. Wing over 400 mm. Back and scapulars not barred ..... *H. nipalensis*, p. 418.

B. Wing under 400 mm. Back and scapulars with wavy cross-bars ..... *H. orientalis*, p. 419.

(1663) Huhua nipalensis.

THE FOREST EAGLE-OWL.

Huhua nipalensis Hodgs., As. Res., xix, p. 172 (1836) (Nepal).
Huhua nepalensis. Blanf. & Oates, iii, p. 287.

Vernacular names. *Huhu, Huhu chil* (Nepal); *Migdori* (Bhut.); *Uman* (Malayalim); *Loho, Bakamuna* (Cing.): *Peria-andha* (Tam., Ceylon); *Dao-bu-gao-deba* (Cachari).

Description. Bristly feathers of lores and cheeks whity-brown with black shafts; aigrettes dark brown, the inner webs and, rarely, the outer webs more or less barred with fulvous-white; upper plumage dark brown, the feathers edged with pale buff and barred at the bases with fulvous, concealed on the crown and nape, showing more on the back and taking up most of the feathers on the rump and upper tail-coverts; tail dark brown with fulvous bars, mottled and dull on the central feathers, broader, brighter and less mottled on the bases of the outer rectrices; scapulars broadly buff with dark brown bars; wing-coverts dark brown, the lesser with narrow buffy-white edges, the median and greater with broad buff edges mottled with brown; primaries dark brown barred with lighter brown; the secondaries more broadly barred with buffy-brown, the innermost like the scapulars; below fulvous or fulvous-white, the throat and breast barred with dark brown, the bars become broad spots on the abdomen, vent and under tail-coverts.

Colours of soft parts. Iris brown or hazel-brown; bill dull wax-yellow to yellow; toes dusky yellow; claws pale horny, darker at the tips.

Measurements. Wing 425 to 470 mm.; tail 229 to 250 mm.; tarsus about 60 to 62 mm.; culmen 52 to 54 mm.

Young birds are pale buff, whiter on the head, the whole plumage above and below barred with dark brown, which becomes broader and further apart on the scapulars, wing-coverts and lower back; the tail and quills of the wing are like those of the adult.

Distribution. Himalayas, West from Kuman, East to Assam, the hills of Central Burma and Bilagun Island near Moulmein. South it is found in the forests of the Nilgiris and Malabar through Travancore to the hills of Ceylon.

Nidification. This magnificent Owl breeds in the Himalayas from February to March and I took one egg hard-set in Cachar on the 20th June, evidently a second laying after one young had been hatched and brought up in the same hollow. In Travancore Stewart found it breeding in December and January. It lays its egg, nearly always one only, either in some natural hole in a big tree, in a hollow between the main boughs, an old Eagle's nest or on the ground or in some cave in a cliff or bank. I have never

seen any nest made and even old nests of Eagles are used as they are found, without repairs. Ten eggs average 61·2 × 49·9 mm.: maxima 65·0 × 52·4 mm.; minima 57·0 × 48·5 mm.

Habits. The Forest Eagle-Owl is a forest dweller by day but it keeps either on the outskirts of these or on the banks of the bigger streams. As soon as it is twilight it sallies off after its prey and when hungry does not hesitate to hunt by daylight. For this purpose it quits the heavy forest and takes to open country, light scrub and bamboo-jungle, or thin deciduous forest. This Owl is certainly the boldest of all Owls, it preys constantly on the largest pheasants, jungle-fowl and does not hesitate to attack peafowl. I once saw one hurl itself headlong at a row of roosting peafowl, one of which it seized and brought tumbling to the ground, the peafowl in the death grip of the Owl; another time I saw one feasting on a big civet cat which showed by the marks that it had been killed by the bird. The power of its grip is extraordinary and it will drive its claws half an inch deep into the leg or arm of a man. The usual note is a very deep mumble and when, as was often the case, a pair perched on my house-roof at night, the noise sounded just like two old men conversing in very deep tones. It also has a loud caterwaul—a single note very seldom used but very piercing. It eats fish, snakes and monitor lizards as well as game etc. and will also devour carrion, for I once disturbed it eating the remains of a tiger and once that of a goat.

Huhua orientalis.

Strix orientalis Horsf., Trans. Linn. Soc. xiii, p. 140 (1821).

Type-locality: Java.

The typical form is a little smaller than that which comes as far North as Tenasserim.

(1664) Huhua orientalis sumatrana.

THE MALAY EAGLE-OWL.

Strix sumatrana Raffles, Trans. Linn. Soc. xiii, p. 279 (1822) (Sumatra).
Huhua orientalis. Blanf. & Oates, iii, p. 289.

Vernacular names. None recorded.

Description. Bristly feathers of face dirty white, with white shafts terminating in black bristles; a very dark brown supercilium from the culmen to the aigrettes; aigrettes dark brown, more or less barred with white and buffy-white; feathers of the crown sometimes whitish next the supercilia and aigrettes; remainder of upper surface dark brown, narrowly barred with dull rufous; tail dark brown with mottled white tip, the central rectrices narrowly barred with mottled brown and whitish, the bars broader and more white on the inner webs of the outer

feathers; wing-coverts like the back; scapulars with a considerable amount of white on the outer webs; primaries dark brown, tipped and barred with darker brown and, all but the first, with much broader lighter bars on the base of the inner web; below white, more or less tinged with fulvous and barred throughout with dark brown, most closely so on the breast, least closely on the abdomen and vent.

Colours of soft parts. Iris dark brown; bill, cere, eyelids and feet yellow (*Davison*).

Measurements. Wing 328 to 359 mm.; tail 175 to 184 mm.; tarsus about 48 to 51 mm.; culmen 41 to 45 mm.

Young birds are white with narrow bars everywhere of dark brown above, paler brown below; the wing- and tail-quills are similar to those of the adults.

Distribution. Sumatra and Borneo, through the Malay Peninsula as far North as Southern Tenasserim.

Nidification. Nothing recorded. A series of twelve eggs sent to me as of this bird averages 53·5 × 43·9 mm. They were said to have been taken from caves in the low hill cliffs at the foot of the mountains some way inland from Simpang and again from Selangor. They apparently breed during January and February.

Habits. As far as is known similar to those of the preceding bird but there is very little on record. It must be a comparatively common bird in the lower mountains of the Malay Peninsula as in 1910, '11 and '12 I had a number of skins sent to me from various localities.

Genus **NYCTEA**.

Nyctea Stephens in Shaw's Gen. Zool. xiii, ii, p. 62 (1826).

Type, *Strix nyctea* Linn.

The present genus differs from the preceding in having very small, hardly visible aigrettes and in having the feathers of the face and of the legs extremely long and hairy, almost concealing the bill and toes; the under tail-coverts are very long, reaching practically to the end of the tail; otherwise tail and wings are as in *Bubo*.

This genus contains a single species only, circumpolar in distribution, once found in Indian limits.

(1665) **Nyctea nyctea.**

THE SNOWY OWL.

Strix nyctea Linn., Syst. Nat., 10th ed., i, p. 93 (1758) (Sweden).
Nyctea scandiaca. Blanf. & Oates, iii, p. 290.

Vernacular names. None recorded.

Description. Pure white, a few traces of brown bars on the

wing- and tail-quills and a few spots on the coverts nearly always visible, even in the oldest birds.

Colours of soft parts. Iris golden yellow; bill black.

Measurements. ♂, wing 395 to 415 mm.; tail 220 to 245 mm.; culmen 27 to 29 mm.: ♀, wing 425 to 475 mm. (*Hartert*); tarsus about 60 mm.

Young birds are barred with narrow pale brown bars below and with broader rather crescentic bars above; the face, chin, throat, much of the nape and sides of the neck are immaculate, as are the shorter feathers of thigh, tarsus, vent and under wing-coverts.

Distribution. The Northern portion of both hemispheres, moving South in Winter to North Central Europe and Central Asia. In India a specimen was obtained at Mardan in the North-West Punjab.

Nidification. The Snowy Owl breeds during April, May and June, according to latitude, the birds in the far North breeding six weeks or two months later than those in the more Southern parts. The eggs number four to ten and are laid on the ground with no nest on some small rising piece of ground or tussock in the Tundras. One hundred eggs average 57·3×45·1 mm.: maxima **63·0**×46·5 and 60·3×**48·4** mm.; minima **51·5**×43·7 and 55·0×**42·0** mm.

Habits. This Owl is said to feed on rabbits, mice, birds from the size of the Finches to those as big as Ducks. It also pursues the hoards of Lemmings, travelling South with them until sometimes far beyond their usual haunts. Occasionally also it eats fish. In Winter it migrates from the circumpolar regions as far South as France, Switzerland, Caspian and Black Seas and Central Asia.

Genus OTUS.

Otus Pennant, Ind. Zool., p. 3 (1769).

Type, *Otus bakkamœna* Pennant.

The genus *Otus* (*Scops* auct.) contains a large number of small Owls with well-developed aigrettes and a very beautiful vermiculated and speckled plumage. The head is proportionately rather large; the bill rather small with the round nostrils pierced in the margin of the cere; the wing is long but varies considerably in shape; the tail is moderate and rounded at the ends; the tarsus is completely, or almost completely, covered with feathers. The sexes are alike but the plumage of the young differs from that of the adult.

Since the last edition of the 'Avifauna' was written much more material has been available for comparison, with the result that it has been possible to work out the specific and subspecific values

of the differences in these little Owls far more accurately, though the net result has been merely to confirm the forms accepted by that wonderful naturalist, Allan Hume.

Key to Species.

A. Fourth or fifth quill longest; first primary much shorter than eighth.
  a. A distinct pale collar on hind-neck..... *O. bakkamœna*, p. 422.
  b. No distinct collar on hind-neck.
    a'. Wing under 160 mm.
      a''. Tarsus feathered to base of toes .. *O. spilocephalus*, p. 427.
      b''. Lower third of tarsus bare ..... *O. balli*, p. 429.
    b'. Wing over 170 mm. ..... *O. sagittatus*, p. 430.
B. Third quill longest; first longer than eighth.
  c. Feathers of tarsus extending on to base of toes ..... *O. brucei*, p. 431.
  d. Feathers of tarsus not extending to base of toes.
    c'. First primary equal to or longer than fifth ..... *O. scops*, p. 432.
    d'. First primary equal to eighth or between seventh and eighth ..... *O. sunia*, p. 435.

Otus bakkamœna.

Key to Subspecies.

A. Smaller, wing 162 mm. or under.
  a. Darkest; very small, wing 135 to 152 mm. ..... *O. b. bakkamœna*, p. 422.
  b. Intermediate in colour; wing 152 to 162 mm. ..... *O. b. marathæ*, p. 424.
  c. Palest; wing 153 to 162, rarely up to 167 mm. ..... *O. b. gangeticus*, p. 425.
B. Larger, wing 162 mm. or over.
  d. Toes feathered to the subterminal phalanx ..... *O. b. plumipes*, p. 425.
  e. Toes not feathered.
    a'. Very pale; wing 165 to 175 mm..... *O. b. deserticolor*, p. 426.
    b'. Dark; wing 162 to 182 mm. ..... *O. b. lettia*, p. 427.

(1666) Otus bakkamœna bakkamœna.

THE CEYLON COLLARED SCOPS OWL.

Otus bakkamœna Pennant, Ind. Zool., p. 3 (1769) (Ceylon).
Scops bakkamœna. Blanf. & Oates, iii, p. 297 (part).

Vernacular names. *Pedda chitta guba* (Tel.).

Description. Lores, feathers above the eye and sides of forehead white or rufous-white, the long bristly feathers black-tipped; remainder of face pale rufous or brown, indistinctly barred darker; ruff whitish-brown or rufous with a dark brown edge; crown and nape buff or fulvous with deep rich brown centres and bars to

each feather, the aigrettes with inner webs white or buff speckled more or less with black ; upper parts fulvous, rufous or pale grey-brown, with central black streaks, fine wavy bars of brown and small spots of fulvous, rufous or greyish, the paler spots more numerous and larger on the hind-neck, where they form a well-defined collar ; tail brown, barred with some shade of fulvous or rufous mottled with darker brown ; scapulars like the back but with more fulvous on the outer webs, showing up conspicuously ; wing-coverts like the back, the median coverts with large pale terminal spots of some shade of fulvous, rufous or greyish ; primaries dark brown, the outer webs boldly, the inner

Fig. 69.—Head of *O. b. bakkamœna*. ¾.

webs faintly, barred with paler ; the visible portions of the secondaries barred like the tail ; chin and patch below throat white or buffy-white ; throat buff with ivory-black bars and broader tips ; remainder of lower surface white to rich buff, with black streaks and numerous tiny wavy bars of reddish-brown, the under tail-coverts, vent and leg-feathers sometimes immaculate.

Colours of soft parts. Iris yellow, golden yellow, hazel or brown ; bill yellowish or greenish-horny, the culmen and tip darker ; cere dusky green, feet fleshy-grey to greenish-yellow.

Measurements. Wing 135 to 152 mm., once 154 mm. (*Ticehurst*) ; tail 64 to 74 mm. ; tarsus 30 to 32 mm. ; culmen about 20 to 22 mm.

Young birds are from a pale grey or fulvous to a warm fulvous barred all over with narrow dusky brown bars, these covering even the face and chin.

Nestlings in down are pure white.

Distribution. Ceylon and South India as far North as the South Konkan and Madras.

The coloration of this race, as in all the others, varies very

greatly. A specimen obtained by Jerdon in Madras has no fulvous or rufous tinge at all but is quite grey in general tone with a little pale buff or yellowish-white showing on the scapulars and neck. A second specimen from the same place is very rich fulvous, almost rufous, in its general appearance; intermediate specimens are common.

Nidification. This Scops Owl is resident and breeds wherever found from the plains up to some 2,000 feet in Travancore and up to 5,000 in Ceylon. In the Niligris, Shevaroys and other Hills of South India it appears to ascend as high as 4,000 feet to breed. Bourdillon found it in Travancore laying its eggs in holes in buildings but elsewhere it nests in natural holes in trees, laying two or three eggs only in Ceylon, four or five in Southern India. Twenty eggs average 31·8 × 27·0 mm.: maxima **35·0** × 28·2 and 33·0 × **29·2** mm.; minima **36·0** × 26·0 and 30·5 × **25·3** mm. The breeding-season is from December to March.

Habits. Except in some parts of Travancore, where Bourdillon and Stewart found it very common, it seems to be rather a scarce bird. Nor would the fact that it is entirely nocturnal account for its seeming rarity, for its note, a soft "too-whoo" of two syllables run into one, is so constantly repeated that its presence can hardly escape notice. It prefers orchards, isolated clumps of trees, gardens and the edges of forest, often frequenting the vicinity of bungalows in tea and rubber estates. In addition to the ordinary call, which is uttered by both sexes seated in densely foliaged bushes and trees, it has a loud hissing note, expressing rage and a low growl of defiance when disturbed on the nest. Its flight is swift and silent but often dipping. It feeds principally on insects but also on mice, bats and small birds.

(1667) Otus bakkamœna marathæ.

THE CENTRAL INDIAN COLLARED SCOPS OWL.

Otus bakkamœna marathæ Ticehurst, Bull. B. O. C., xlii, p. 122 (1922) (Raipur, Central Provinces).
Scops bakkamœna. Blanf. & Oates, iii, p. 297 (part).

Vernacular names. *Tharkavi choghad* (Hind.).

Description. Differs from typical *O. b. bakkamœna* in its larger size. It is much the same average in degree of darkness but as a race is much less rufous and much more grey in general tone.

Colours of soft parts as in the other races.

Measurements. Wing 152 to 162 mm., once 165 mm. (*Ticehurst*). British Museum skins have wings from 145 to 157 mm.

Distribution. Central Provinces to Sambalpur and Manbhum in South-West Bengal.

Nidification. Hume records that he took its eggs several times in Sambalpore and Saugur and doubtless it breeds wherever found

from January to April. Hume's eggs now in the British Museum average about 33·0 × 27·9 mm.

Habits. Those of the species.

(1668) Otus bakkamœna gangeticus.

THE UNITED PROVINCES COLLARED SCOPS OWL.

Otus bakkamœna gangeticus Ticehurst, Bull. B. O. C., xlii, p. 122 (1922) (Fategarh).
Scops bakkamœna. Blanf. & Oates, iii, p. 297 (part).

Vernacular names. *Tharkavi choghad* (Hind.).

Description. Only differs from *O. b. marathæ* in being very slightly paler.

Colours of soft parts as in the other races.

Measurements. Wing 146 to 167 mm.; culmen 19 to 21 mm.

Distribution. Rajputana and United Provinces (*Ticehurst*). The Bihar bird also appears to be nearest this form.

Nidification. This is a very common Owl in the United Provinces and Bihar, breeding from February to April and generally depositing its eggs, three or four in number, very rarely five, in natural hollows in large Mango-trees. I have often seen this Owl and the Ringed Paroquet breeding in the same tree in holes close to one another. Fifty eggs average 33·1 × 28·1 mm.: maxima **35·2 × 28·9** and 35·1 × **29·9** mm.; minima **31·0 × 27·0** mm. Occasionally this Owl is said to lay its eggs in holes in old buildings.

Habits. This Scops Owl is a very familiar bird, frequenting open well-wooded country in the vicinity of villages and towns, mango-groves being their favourite haunts. They are nocturnal birds but may often be seen flitting from one garden tree to another on moonlight nights, their rather musical "too-whoo" being uttered as they perch in the dense foliage. They frequently enter the verandahs of bungalows when hunting for bats and insects.

(1669) Otus bakkamœna plumipes.

THE PUNJAB COLLARED SCOPS OWL.

Ephialtes plumipes Hume, My Scrap-book, p. 397 (1870) (Murree).
Scops bakkamœna. Blanf. & Oates, iii, p. 297 (part).

Vernacular names. *Tharkavi choghad* (Hind.).

Description. General colour much as in *O. b. bakkamœna* but rather darker and differing from that and all other races in having the feathering of the tarsi extended on to the toes.

Colours of soft parts as in the other races.

Measurements. Wing 162 to 182 mm.; culmen 22 to 24 mm.

Distribution. The North-West Himalayas from Murree to Garhwal.

Nidification. This Scops Owl breeds about Simla during April and May, half-incubated eggs having been taken on the 13th May. Whymper also took some on the point of hatching on the 24th and 25th of April at Naini Tal and Bhim Tal. Hume's eggs measured about 32·2×28·0 mm.

Habits. Those of the species. This Scops Owl ascends the Himalayas up to at least 7,000 feet, though it is more common between 3,000 and 5,000 feet.

(1670) Otus bakkamœna deserticolor.

THE SIND COLLARED SCOPS OWL.

Otus bakkamœna deserticolor Ticehurst, Bull. B. O. C., xlii, p. 57 (1922) (Hyderabad, Sind).
Scops bakkamœna. Blanf. & Oates, iii, p. 297 (part).

Vernacular names. None recorded.

Description. Distinguished from all other races of *bakkamœna* by its pale colouring. The five specimens in the British Museum Collection have the pale yellow-buff spotting on the scapulars and neck very pronounced and the under plumage very grey with but little fulvous tinge except on the fore-neck and upper breast.

Colours of soft parts as in the other races.

Measurements. Wing 165 to 175 mm.; culmen 20 to 22 mm.

Distribution. Sind and Baluchistan. A young bird from Muscat is considered by Ticehurst to be of this race and he records that there is another specimen in the Karachi Museum labelled "Bushire."

Nidification. A clutch of four eggs taken by Harington Bulkley in Sind and given to me were probably, judging by his notes, taken on the Pabb Hills. The eggs are labelled "Sind—Baluchistan, 1. iii. 90." They measure 32·9×27·2 mm. Bell found a pair breeding in the bottom of a Vulture's nest, having young on the 13th March, whilst Butler found a young one on the ground, having been turned out of a nest 40 feet up in a tall tree, on the 10th April.

Habits. Ticehurst says that the Scops Owl is fairly common in the thicker forests of Sind but that they escape notice as they lie up by day in thick-foliaged trees and only at dark is their presence revealed by their soft note.

(1671) Otus bakkamœna lettia.

THE BURMESE COLLARED SCOPS OWL.

Scops lettia Hodgs., As. Res., xix, p. 176 (1836) (Nepal).
Scops bakkamœna. Blanf. & Oates. iii, p. 297 (part).

Vernacular names. *Lattya kusyal* (Nepal).

Description. Differs from *O. b. bakkamœna* in its much larger size but is practically the same in general tone of plumage.

Colours of soft parts as in the other races.

Measurements. Wing 162 to 182 mm.; culmen 20 to 23 mm.

Distribution. Nepal, Sikkim, Bhutan to Eastern and Southern Assam, Manipur, Tippera and Chittagong in Eastern Bengal and practically the whole of Burma.

Nidification. This little Owl breeds in great numbers in Assam during February, March and April, laying three or four eggs in holes in trees, either natural ones or deserted nest-holes of Woodpeckers or Barbets. One nest I found in the base of an Eagle's (? *Ichthyophaga*) nest was well lined with grass. Thirty eggs average 32·3×28·1 mm.: maxima **34·0×29·5** mm.; minima **29·2** ×27·0 and 31·0×**26·4** mm.

Habits. Those of the species. It is found in the Eastern Himalayas from the foot-hills up to 8,000 feet or more and in the Assam Hills up to 7,000 feet, as well as in the adjoining plains.

Otus spilocephalus.

Key to Subspecies.

A. General tone of colour rufous-brown .... *O. s. spilocephalus*, p. 427.
B. General tone grey- or fulvous-brown.... *O. s. huttoni*, p. 429.

(1672) Otus spilocephalus spilocephalus.

THE EASTERN SPOTTED SCOPS OWL.

Ephialtes spilocephalus Blyth, J. A. S. B., xv, p. 8 (1846) (Darjeeling).
Scops spilocephalus. Blanf. & Oates, iii, p. 295 (part).

Vernacular names. *Dao-hoo-too* (Cachari.)

Description. Face rufous-brown, the bristly feathers pale at the base and tipped blackish, the ear-coverts and cheeks barred with blackish; ruff rufous-buff with obsolete bars of blackish and dark brown or blackish tips; upper parts rufous-brown, the forehead and sides of the crown sometimes paler and buffish; the crown with numerous pale rufescent spots edged with black; these broaden on the hind-neck and back into bars, most numerous and forming a more or less ill-defined collar on the

hind-neck; scapulars mostly white on the outer webs with bold black tips; remainder of upper plumage and wings vermiculated with black, more boldly so on the wing-coverts; edge of wing whitish and outer median coverts boldly marked with buff and black; outer primaries barred and tipped rufescent on the outer webs, dark and light on the inner webs, mottled towards the tip, inner primaries more boldly marked and innermost secondaries nearly all rufous-brown with black vermiculations; tail rufous-brown, with bars of blackish mottled and broken with chestnut; lower parts rufous or rufescent-brown, much mottled and vermiculated with white, or buffy-white, and black, the markings on the breast larger and more of the nature of spots and bars.

One or two specimens in the British Museum Collection are practically without any rufous tinge below and are in this respect very like the next race, but they have much more rufous upper parts.

Colours of soft parts. Iris golden yellow; bill horny or wax-yellow; feet fleshy-brown.

Measurements. Wing 137 to 151 mm.; tail 77 to 90 mm.; tarsus about 31 to 32 mm.; culmen about 17 to 18 mm.

The fourth, or fourth and fifth, primaries are longest; the first shorter than the tenth. The toes are bare, the tarsal feathering not reaching quite to their bases.

Distribution. Nepal and Sikkim East to Assam and Manipur. I have also seen specimens from Comilla and Chittagong Hill Tracts in Eastern Bengal and Fea obtained specimens at Bhamo and in Karenni.

Nidification. This bird is comparatively common in Assam, breeding from the foot-hills in Lakhimpur and on the other Hill ranges between 2,000 and 6,000 feet or higher. The eggs seem to be invariably laid in holes in dead trees between five and twenty-five feet from the ground. As a rule the hole selected is a large, natural one, sometimes the deserted nest-holes of Woodpeckers, Barbets or Grakles. The normal full clutch is three or four, less often five or two. Thirty eggs average $32{\cdot}5 \times 28{\cdot}2$ mm.: maxima $\mathbf{34{\cdot}1} \times 27{\cdot}0$ and $33{\cdot}0 \times \mathbf{28{\cdot}6}$ mm.; minima $\mathbf{31{\cdot}1} \times \mathbf{27{\cdot}0}$ mm. The breeding months are April to June in Assam, whilst Hutton and Marshall also obtained eggs of the next race in these months in Mussoorie and Murree, so this Owl is a later breeder than most Scops.

Habits. Those of the genus. In Assam this Scops is entirely a forest bird and even in the night keeps more to woods than do most birds of this genus. Its food seems to be principally large insects, beetles, etc. and, to a less extent, small wood-rodents and lizards. Its note is the usual soft dissyllabic "too-whoo too-whit" of so many other Scops Owls.

(1673) Otus spilocephalus huttoni.

THE WESTERN SPOTTED SCOPS OWL.

Ephialtes huttoni Hume, Rough Notes, p. 193 (1869) (Jerripani, Mussoorie).
Scops spilocephalus. Blanf. & Oates, iii, p. 295 (part).

Vernacular names. None recorded.

Description. Differs from the preceding race in being generally much paler and greyer and in wanting the rich rufous tinge.

Colours of soft parts as in true *O. s. spilocephalus.*

Measurements. Wing 135 to 144 mm.; tail 71 to 76 mm.; tarsus 30 to 31 mm.; culmen 17 mm.

Distribution. Kuman from Murree and Mussoorie to the Simla States and Garhwal.

The difference between the two races of *spilocephalus* are such as in other species of Scops Owls would be regarded as merely individual variations but in this species the rufous and grey phases seem to belong to definite geographical areas; in the extreme West the birds are always grey and in the extreme East always rufous, whilst a few birds from Nepal are somewhat intermediate. Each phase varies to some degree in depth of colouring but in the British Museum Collection, except for these Nepal birds, there is no individual which cannot be easily placed with one or the other.

Nidification. The Western Spotted Scops breeds in Kuman, the Simla States and Garwhal in March, April, May and June, laying two or three eggs in the same kind of holes as the preceding bird. Twenty eggs average 31·9 × 27·6 mm.: maxima 34·9 × 28·4 and 31·0 × 28·8 mm.; minima 31·0 × 27·0 mm.

Habits. Similar to those of the preceding race.

(1674) Otus balli.

THE ANDAMAN SCOPS OWL.

Ephialtes balli Hume, Str. Feath., i, p. 407 (1873) (Andamans).
Scops balli. Blanf. & Oates, iii. p. 296.

Vernacular names. None recorded.

Description. Face fulvous-white to dark brownish-fulvous, the bristles white at the base, black at the tip; the cheeks and ear-coverts finely barred with blackish; upper plumage dark brown, slightly tinged with rufous and finely vermiculated with black; crown, back to upper tail-coverts and inner wing-coverts freely spotted with black-edged whitish-fulvous spots, most numerous on the crown and neck, forming an ill-defined collar on the latter; primaries dark brown, notched with pale rufous and with white bars on the outer webs and bases of inner webs, the secondaries

more rufous, the pale bars reduced to spots and the whole much mottled with dark brown; scapulars white on the outer webs, barred and tipped with blackish; tail rufous, much vermiculated dark brown and with faintly-defined dark and pale buff bars; lower parts fulvous-grey, vermiculated everywhere with dark brown and with numerous white spots, edged with black.

Colours of soft parts. As in *Otus b. bakkamœna.*

Measurements. Wing 138 to 143 mm.; tail 75 to 77 mm.; tarsus 27 to 28 mm.; culmen 19 to 20 mm.

The fifth quill is longest and the terminal third of the tarsus is unfeathered.

Young birds are much paler and more rufescent, the head and shoulders with fine brown bars.

One specimen, nearly adult, is still very rufous and it may be that this little Owl has a paler, more definitely rufous phase as well as the dark brown one.

Distribution. Andamans.

Nidification. The Andaman Scops breeds during February, March and April, laying its eggs in natural hollows in large trees at heights between six and twenty feet from the ground. A very favourite site seems to be a hole in one of the Padouk-trees, which form avenues to most of the roads about Port Blair. The full clutch is generally only two eggs, seldom three. Twenty average 30·5×27·1 mm.: maxima **32·9×28·1** mm.; minima **29·1×27·5** and 30·2×24·3 mm.

Habits. Osmaston records these little Owls as very common in the Andamans but so entirely nocturnal that they are but little seen. He notes that he captured one female on her nest but after keeping her for four days released her on another island two miles away. Returning three weeks later to look at the same nest he found it again occupied by a female, presumably the same, with two fresh eggs.

(1675) Otus sagittatus.

THE LARGE MALAY SCOPS OWL.

Ephialtes sagittatus Cassin, Proc. Ac. Nat. Sci., Philadelphia, iv, p. 121 (1850) (Perak).
Scops sagittatus. Blanf. & Oates, iii, p. 296.

Vernacular names. None recorded.

Description. Feathers round the eye deep rufous, the loral bristles paler with black tips; cheeks and posterior ear-coverts pale chestnut; a deep rufous semi-band on either side of the neck; forehead, anterior crown and broad superciliá, extending to the aigrettes, faintly vermiculated with brown and tipped and mottled with chestnut on the aigrettes; hinder crown, neck and upper plumage rufous-chestnut, with small indistinct spots of

pale buff bordered with blackish on the neck and back; scapulars rufous-white on the outer webs with short alternate half-bars of white and rufous on the inner webs; wing-coverts like the back but generally more boldly spotted; quills dull pale rufous with darker bars and the base of the inner webs blackish-brown; inner secondaries rufous-chestnut with concealed black bars, mottled more or less with rufous; tail rufous, indistinctly barred with blackish; lower plumage pale rufous, vermiculated with brown on the breast and throat, each feather with a pale or whitish centre, broken with black spots.

Colours of soft parts. Iris deep brown; bill bluish-white, the cere pale bluish-green; legs, feet and claws bluish-white.

Measurements. Wing 178 to 186 mm.; tail 115 to 123 mm.; tarsus 30 to 31 mm.; culmen 23 to 26 mm.

The fifth quill is the longest, the fourth and sixth very little shorter; the tarsus is feathered almost to the base of the toes.

Distribution. Tenasserim, the Malay Peninsula and Siam.

Nidification. Nothing recorded. Herbert took numerous eggs in and round about Samkok during February, whilst Kellow took two clutches near Perak in March and February respectively. In one case there were four eggs, in the others three. Seventeen eggs average 34·2×28·5 mm.: maxima **37·6**×29·0 and 34·5×**19·2** mm.; minima **32·2**×**27·7** mm.

Habits. Very little known. It appears to be confined to forest country in and near the foot-hills. The stomachs of those examined by Davison contained nothing but insects and moths.

(1676) Otus brucei.

THE STRIATED SCOPS OWL.

Ephialtes brucei Hume, Str. Feath., i, p. 8 (1873) (Bombay).
Scops brucii. Blanf. & Oates, iii, p. 294.

Vernacular names. *Kutruz* (Mahr.).

Description. Face grey, the loral bristles white with black tips; ruff tipped with dark brown; forehead and sides of the crown grey, stippled with dark brown; remainder of upper plumage white or fulvous-white vermiculated everywhere with very fine dark bars, each feather with a black central streak, broadest and most conspicuous on the crown; outer webs of scapulars whitish with black tips; tail vermiculated dark brown and whitish with indistinct pale bars with dark edges, the bars obsolete on the central tail-feathers; wing-coverts like the back, the outer webs of the outer coverts more boldly marked with pale spots; primaries dark brown, notched with pale fulvous on the first, barred with whitish on the outer webs of the others, much mottled at the tips, the mottling increasing until the inner secondaries are like the back; under surface fulvescent white, vermiculated and streaked like the back.

The general aspect of most birds is that of a pale grey streaked with black but in a few specimens the fulvous tint is strong enough to make that the prevailing tone.

Colours of soft parts. Iris bright yellow; bill horny-yellow, the tip and culmen darker, the lower mandible paler; feet grey, the soles paler, and the claws dark horny.

Measurements. Wing 150 to 161 mm.; tail 78 to 82 mm.; tarsus 34 mm.; culmen 17 to 18 mm.

The third primary is longest, or third and fourth subequal; the first primary is very long, equal to the sixth or between the sixth and seventh; the feathering on the tarsus reaches to the base of the toes.

The young bird is fulvous-white or very pale grey, barred above and below with fine wavy bars of dark brown; wing- and tail-quills like those of the adult.

Distribution. Palestine, Transcaspia, Mesopotamia, West Turkestan, Persia, Afghanistan, Baluchistan and Gilgit. In India it has been obtained in Ahmednagar and Ratnagiri in the Bombay Presidency; Hyderabad, Umarkoti and Khipra in Sind and at Sultanpur in Oudh. It has also been obtained at Quetta.

Nidification. The Striated Scops Owl is very common in Persia, breeding principally in May but also in late April and early June, whilst at Hilla in Mesopotamia Aldworth took eggs on the 29th April. Its favourite nesting-site at Kerman seems to be a Magpie's old nest but it also breeds in holes in walls, old buildings and in trees, whilst at Yazd Petherick found it laying only in holes in trees. Forty eggs average 31·1 × 27·3 mm.: maxima **33·0** × 26·3 and 31·7 × **28·1** mm.; minima **29·0** × 26·0 and 30·3 × **25·8** mm.

Habits. Whether this bird is a resident or not in Sind is not yet known but it is certainly only a straggling visitor to the other places in India in which it has been found. Cheeseman says of this Owl that it flies as fast as a Bat, taking insects on the wing. It feeds just before dusk but is not seen in the daytime, though it is a bird which haunts gardens and fruit-groves and any open country in which there is plenty of cover in the way of densely-foliaged trees. It occurs in Persia and Mesopotamia etc. from the plains up to 6,000 feet. Cheeseman syllabifies its call as "boo·boo" and Currie as a soft double "toot toot."

Otus scops.

Strix scops Linn., Syst. Nat., 10th ed., i, p. 92 (1758).

Type-locality: Italy.

Differs from our Indian race in averaging a trifle smaller and rather less deeply coloured; many birds of the two races are however, practically indistinguishable.

Key to Subspecies.

A. Larger and not so dark.
  a. Larger and paler; wing 150 to 158 mm. . *O. s. pulchellus*, p. 433.
  b. Smaller and darker; wing 122 to 135 mm. *O. s. rufipennis*, p. 434.
B. Smallest and darkest; wing 119 to 127 mm. *O. s. leggei*, p. 434.

(1677) Otus scops pulchellus.

THE EASTERN SCOPS OWL.

Strix pulchella Pall., Reise Prov. Russ., Reichs, i, p. 456 (1771). (Siberia).
Scops giu. Blanf. & Oates, iii, p. 291 (part).

Vernacular names. None recorded.

Description. Loral bristles white with black tips; face grey, very minutely stippled black and white, the edge of the ruff velvety-black and rufous; whole upper plumage minutely vermiculated black and white, more or less tinged with rufous or golden-fulvous and each feather with a central black streak; the forehead, broad supercilia and aigrettes on the inner webs much mottled with white; on the nape there are numerous pale or whitish spots on either side of the shaft, often forming an indefinite collar; outer webs of scapulars fulvous or rufous-white, tipped black; primaries barred on the outer web with white and mottled brown and on the inner web with brown and mottled brown; tail barred with brown, fulvous and with mottled bars of fulvous and brown; lower plumage stippled white and dark brown, each feather streaked with brown and with whitish spots on either side of the terminal half of the shaft-streaks. In some specimens the rufous colouring is much more dominant and in these the general appearance is that of a golden-rufous bird rather than of a grey one.

Colours of soft parts. Iris pale to deep golden-yellow; bill dusky greenish-yellow, darker at tip and on culmen; feet pale fleshy or fleshy-grey.

Measurements. Wing 150 to 158 mm.; tail 66 to 71 mm.; tarsus 26 mm.; culmen 16 to 17 mm.

Third quill longest, first primary equal to fifth or slightly longer.

Young birds are barred below with brown on a whitish ground and also are speckled and vermiculated brown and fulvous-white, or brown and rufous, with no black central streaks but with white on the scapulars as in the adult.

Distribution. South Russia, Transcaspia, Turkestan, Persia, Mesopotamia, Aden (*Barnes*), Palestine, Afghanistan, Baluchistan. In India it is only a Winter straggler into the extreme North-West, Hyderabad in Sind, Baluchistan and Kandahar.

Nidification. The Eastern Scops Owl breeds during April, May and June, laying its eggs in holes in walls, buildings, old wells, trees and sometimes in old nests of Magpies and other birds.

It lays three to six eggs and Jourdain gives the following measurements of 44 specimens. Average 31·32 × 27·02 mm.: maxima **34·5** × 27·4 and 31·5 × **28·7** mm.; minima **29·3** × 27·0 and 31·4 × **26·0** mm.

Habits. Much the same as those of the other Scops. Cheeseman found this Scops very plentiful near Teheran where it was breeding in June. He says "the note of this bird resembles the tinkling of a small brass bell and, as the birds seldom have exactly the same note, the combined effect of several is like an erratic peal of small bells." It feeds mainly on insects but also on mice and small birds.

(1678) Otus scops rufipennnis.

Scops rufipennis Sharpe, Cat. B. M., ii, p. 60 (1875) (Southern India, Madras).
Scops giu. Blanf. & Oates, iii, p. 291 (part).

Vernacular names. *Chitta guba*, *Yerra chitta guba* (Tel.).

Description. Similar to *O. s. sunia* but smaller and rather darker, at the same time it is not so dark as *O. s. modestus*, nor has it the prevailing rather brown tinge.

Colours of soft parts as in the other races.

Measurements. Wing 122 to 135 mm.; tail 52 to 62 mm.; tarsus 25 to 26 mm.; culmen 17 to 18 mm.

Distribution. Khandesh, Belgaum and the Southern Bombay Presidency down the West Coast to South Travancore; the Carnatic from Madras Southwards.

Nidification. Nothing recorded.

Habits. Those of the species.

(1679) Otus scops leggei.

The Ceylon Scops Owl.

Otus scops leggei Ticehurst, Ibis, 1923, p. 242 (Ceylon).
Scops giu. Blanf. & Oates, iii, p. 291 (part).

Vernacular names. *Punchi bassa* (Cing.); *Sinna-andai, nattu* (Tam.).

Description. Differs from all other races in being much smaller and much darker.

Colours of soft parts as in the other races.

Measurements. Wing 119 to 127 mm.; tail 49 to 54 mm.; tarsus 20 to 21 mm.; culmen 17 to 18 mm.

Distribution. Ceylon only.

Nidification. Nothing known.

Habits. Those of the species. Apparently a rare bird, frequenting outskirts of forest, Tea and Rubber plantations. The

note is a low "woot-woot." Legge records its killing and eating small birds such as White-eyes and Munias, whilst it seems especially fond of the smaller bats.

Otus sunia.

The Owlets of this species are all separated from the Scops by the wing formula. In *Otus scops* and its races the first primary is very long and about equals the fifth, whilst in *sunia* it is short and about equals the eighth. In *scops* the third primary is longest but exceeds the second and fourth by very little; in *sunia* the fourth is longest, slightly exceeding the fifth.

Key to Subspecies.

A. Larger; wing 132 to 156 mm., generally over 140 mm.
  a. General colour much paler ..... *O. s. sunia*, p. 435.
  b. General colour much darker.
    a'. Paler; wing 143 to 156 mm. ..... *O. s. modestus*, p. 437.
    b'. Darker; wing 134 to 148 mm..... *O. s. malayanus*, p. 437.

(1680) Otus sunia sunia.

THE NORTHERN INDIAN SCOPS OWL.

Scops sunia Hodgs., As. Res., p. 175 (1836) (Nepal).
Scops giu. Blanf. & Oates, iii, p. 291 (part).

Vernacular names. *Choghad Kusial*, *Sunya Kusial* (Nepal); *Dundul* (Chamba).

Description. Very similar to *Otus scops pulchellus* but browner and more finely vermiculated above with fewer central streaks, these being sometimes absent except on the forehead and crown; the undersides are also less streaked and rather more barred.

This little Owl has a very definite rufous phase in which there are no vermiculations on the upper plumage and merely a few black streaks on the forehead and crown; the scapulars are rufous-white on the outer webs with the usual black tips; the tail is rufous with narrow black bars; the wing-coverts may be either immaculate or retain more or less of the markings of the ordinary grey phase; the quills are rufous but seem always to retain the markings to a considerable extent; below, the chin, throat and breast is rufous, the latter marked with black streaks; the remainder of the underparts are as in the normal bird but with bright rufous replacing the grey.

There is also a very dark phase which seems to be rare but which I have seen from Darjeeling and from Assam. In these birds the pale markings are reduced to a minimum and the dark are increased in comparative extent.

Between the rufous, or chestnut, birds and the grey ones there is every degree of variation to be found from those which are

normal with merely a rufous tinge to birds which are almost entirely of this colour.

Colours of soft parts. Iris pale yellow, golden yellow or dark brown; bill horny-green or horny-yellow, tipped blackish; feet dingy yellowish flesh or fleshy-grey.

Measurements. Wing 137 to 154 mm.; tail 61 to 71 mm.; tarsus 25 to 26 mm.; culmen 16 to 18 mm.

Young birds are only distinguishable from those of *Otus scops* by their wing formula.

Distribution. Lower Himalayas from Hazara and Kuman to Bhutan; South it extends to the Punjab, United Provinces, Central Provinces, Bihar and Bengal. Birds from Assam are somewhat intermediate but those from the North as far East as Dibrugarh are nearer *O. s. sunia*, whilst those from the Khasia and Cachar Hills and from Manipur are nearer the Burmese form, *modestus*.

Nidification. This beautiful little Owl was not an uncommon breeder in Assam but probably bred very early, as we saw young fully fledged in April. We took one set of eggs on the Sabansiri, laid in a hole in a stump of a dead tree standing in thin evergreen forest, catching the bird on the nest. Field took eggs in a hole in the walls of one of the ruined temples at Gya on the 21st March and Buchanan had in his collection eggs taken at Murree on the 12th February. The ten eggs average 32·8 × 27·0 mm.: maxima 34·8 × 26·5 and 32·0 × 28·0 mm.; minima 31·0 × 26·1 mm.

Habits. The habits of all the various races of these little Owls are much the same. The birds are entirely nocturnal and it is quite exceptional to see them hunting even in the deep twilight but on bright moonlight nights when sitting up for tiger I have often had opportunities of watching them. They keep much to forest but are also often disturbed from single trees in the open when these are leafy enough to hide them well, as they sit either in an extra dense piece of foliage or close up against the main trunk. By night they prefer more open ground to forest and like to sit on some bare twig where they can survey the country and its possibilities in the game line. They feed mainly on insects, moths, coleoptera and cicadæ, though they will readily attack birds almost as large as themselves and also mice, shrews, rats, etc. Their sight at night is marvellous and they dart straight for and seize prey quite invisible to the human eye. Flying from tree to tree they flap and close their wings alternately, dipping as they do so, but in the breeding-season they often sail round on stiffly outspread wings, squawking softly at the same time, and when hunting they fly with great speed and power. Their usual call is a soft "too-whit too-whit" and they both hiss and growl when angry or handled.

(1681) Otus sunia modestus.

THE BURMESE SCOPS OWL.

Scops modestus Walden, Ann. Mag. Nat. Hist. (4) xiii, p. 123 (1874) (Andamans).
Scops giu. Blanf. & Oates, iii, p. 291 (part).

Vernacular names. None recorded.

Description. Similar to the preceding race but much darker both in the normal grey and in the rufous phase. The general tone is also browner and less grey.

Colours of soft parts as in the other races.

Measurements. Wing 143 to 156 mm.; tail 60 to 72 mm.; tarsus 25 mm.; culmen 17 to 18 mm.

Distribution. Assam, South of the Brahmaputra; Burma South to Tenasserim, North and Central Siam, Cambodia, Shan States, Andamans and Nicobars.

This race cannot be combined with *japonicus* (*vide* Ticehurst, Ibis, 1923), which has a much darker, more vermiculated, less striated under plumage. *Modestus*, founded on young birds from the Andamans, seems to be the earliest name available.

Nidification. In the Khasia and North Cachar Hills this Owl breeds from February to April, but I have taken eggs in May and June, probably second layings. They seem to like trees for nesting purposes which grow on the edges of streams. The eggs are three to four in number, sometimes two only, and twenty-five average 31·6 × 27·0 mm.: maxima 33·1 × 27·2 and 32·2 × 27·5 mm.; minima 30·0 × 25·5 and 30·3 × 25·4 mm.

Habits. Those of the species.

(1682) Otus sunia malayanus.

THE MALAY SCOPS OWL.

Scops malayanus Hay, Madr. Journ. Lit. Sci., xiii, pt. 2, p. 147 (1842) (Malacca).
Scops giu. Blanf. & Oates, iii, p. 291 (part).

Vernacular names. None recorded.

Description. Similar to *O. s. modestus* but darker and smaller. In *modestus* the rufous phase is rare but in *malayanus* very common and, in addition to this, there is a deep rufous or bay-brown phase which is very handsome and is unrepresented in the series of the other races in the British Museum.

Colours of soft parts. As in the other races.

Measurements. Wing 134 to 148 mm.; tail 56 to 62 mm.; tarsus 21 mm.; culmen 17 to 18 mm.

Distribution. Tenasserim, South to Singapore. It is also found in South-West Peninsular Siam, where it was obtained by Herbert.

Nidification. Bingham took eggs of this race on the 11th and 30th March in the Thoungyeen valley, two clutches of three and four eggs respectively, which measure 31·6 × 28·1 mm.

Habits. Those of the species. Bingham speaks of its note as a long, rolling "hur-r-r." Could he possibly have heard a *Glaucidium* and mistaken the note for that of this bird?

Genus **ATHENE**.

Athene Boie, Isis, 1822, i, p. 549.

Type, *Athene noctua* Scop.

In this genus there is no distinct disk and no ruff; the cere is swollen and the nostril a round orifice near the anterior margin; the wings are rounded, the third primary longest, the first between the fifth and eighth; tail moderate; tarsus feathered to the toes which are also covered above with bristles and feathers.

This genus is found throughout Central Europe, Northern Africa, and South and Central Asia to China.

Key to Species.

A. Abdomen transversely barred.
  a. Crown distinctly spotted; first primary longer than seventh ..... *A. brama*, p. 438.
  b. Crown unspotted or merely faintly spotted on the anterior portion; first primary equal to eighth ..... *A. blewitti*, p. 441.
B. Abdomen longitudinally streaked ..... *A. noctua*, p. 441.

Fig. 70.—Head of *A. b. brama*. ¾.

Athene brama.

Key to Subspecies.

A. Wing over 150 mm.
  a. Much darker above; heavily spotted below. *A. b. brama*, p. 439.
  b. Less dark above; less heavily spotted below. *A. b. indica*, p. 440.
B. Wing under 145 mm. ..... *A. b. pulchra*, p. 440.

Ticehurst (Ibis, 1923, p. 61) points out that *Athene brama* was described from Pondicherry. This being so, my *A. b. fryi* becomes a synonym and Franklin's name *indica* is available for the Northern bird, being based on a bird from the United Provinces.

(1683) Athene brama brama.

THE SOUTHERN SPOTTED OWLET.

Strix brama Temm., Pl. Col., pl. 68 (1823) (Pondicherry).
Athene brama. Blanf. & Oates, iii, p. 301 (part).

Vernacular names. *Kukushat*, *Khusattia*, *Ulu*, *Choghad* (Hind.); *Pingala* (Mahr.); *Paini ganté* (Tel.); *Andi* (Tam.).

Description. Forehead, supercilium and lores white or pale buff, the loral bristles tipped black; upper plumage, sides of head and wings uniform earthy-brown, sometimes more grey, sometimes rather rufescent, the crown, nape and sides of head with small white spots, the nape with very large white spots forming a collar, the back with larger white spots, the wing-coverts with small white spots on the inner and larger white spots on the outer; the median coverts also with white edges to the tips; quills with broad, but broken, white bars; tail with narrow white bars on the central, wider ones on the lateral feathers; scapulars with broad white edges; chin, throat, front and sides of neck white; a band below this dark brown; remainder of lower parts white or fulvous-white barred with brown, the bars broad and numerous on breast and flanks, decreasing on abdomen and obsolete on legs and under tail-coverts.

Colours of soft parts. Iris pale to deep golden-yellow; bill greenish-horny, the culmen sometimes a little darker and sometimes more yellow; cere dusky green or greenish-brown; feet yellowish-green, greenish-plumbeous or dirty yellowish.

Measurements. Wing 140 to 155 mm.; tail 65 to 77 mm.; tarsus 27 to 28 mm.; culmen 20 to 22 mm.

Young birds are very like the adults but are much more marked with white above, the spots running into definite bars; below from the breast the dark markings are longitudinal.

Distribution. Travancore, Mysore, Deccan, the Madras and Bombay Presidencies roughly North up to 14°.

Nidification. The Southern Spotted Owlet breeds from November to March, most eggs being laid in February, whilst in Mysore it is said to lay up to the end of April. It deposits its eggs in holes in trees, in buildings either deserted or occupied or occasionally even in holes in banks and rocks. Sometimes it seems to make a fair nest of rubbish upon which to lay its eggs but generally, especially in trees, there is little or no nest. Sometimes it annexes nests of Mynas and other birds which build nests in holes in walls etc. It lays three or four eggs, exceptionally five. Forty eggs average 31·6 × 27 mm.: maxima **33·9** × 25·0 and 33·2 × **28·0** mm.; minima **29·3** × **24·4** mm. The birds are very close sitters and will often allow themselves to be caught, biting and clawing vigorously at their assailants.

Habits. Few birds are more widely or better known than this little Owl, which seems to consider that bungalows are built for its

special benefit. It is found round and in every village, town and factory, sometimes haunting the trees in the gardens and fields round about, sometimes taking up its abode in the houses themselves. It is extraordinarily tame and confiding and a pair will often sit in a verandah chattering and bowing to one another quite untroubled by the presence of human beings. It is most loquacious and has an endless repertoire of calls, most of them something like its native name "Pencha," rapidly repeated in many and varied tones. It also has a soft double "whoo" with which it calls to its mate. Its flight is swift, silent and undulating, with less jerky dips than most Owls have when not hurried. It is principally an insect-feeder but will readily kill and devour small birds and mammals and I have seen it catch bats and also the little wall "Geckos" so common in Indian bungalows.

(1684) Athene brama indica.

THE NORTHERN SPOTTED OWLET.

Noctua indica Frankl., P. Z. S., 1831, p. 115 (United Provinces).
Athene brama. Blanf. & Oates, iii, p. 301 (part).

Vernacular names. *Ulu*, *Kukushat*, *Khusattia* (Hind.); *Pencha*, *Katoria pencha* (Beng.); *Dang-tang pum* (Lepcha).

Description. Differs from the typical race in being much paler and decidedly larger; the tail and wings are generally much more marked with white and the general colour is less brown.

Colours of soft parts as in the other races.

Measurements. Wing 150 to 168 mm.; tail 75 to 81 mm.; tarsus 27 to 28 mm.; culmen 20 to 22 mm.

Distribution. All India North of 14°, East to Assam and West to Sind.

Nidification. Exactly like that of the preceding bird but it lays rather later, most eggs being laid in March and April. It also more often lays five eggs and less often three only. Fifty eggs average 32·2×27·1 mm.: maxima **33·3×28·1** mm.; minima **29·0×25·0** mm.

Habits exactly like those of the Southern Owlet.

(1685) Athene brama pulchra.

THE BURMESE SPOTTED OWLET.

Athene pulchra Hume, Str. Feath., i, p. 469 (1873) (Pegu).
Athene brama. Blanf. & Oates, iii, p. 301 (part).

Vernacular names. *Zee-gwet* (Burm.).

Description. A small dark race, much darker than *A. b. indica* and slightly darker than *A. b. brama*. It also differs from the latter in being more largely spotted with white and in having a less brown, more slaty, tinge in its general colour.

Colours of soft parts as in the other races.

Measurements. Wing 143 to 158 mm.; tail 65 to 74 mm.; tarsus 26 to 28 mm.; culmen 20 to 21 mm.

Distribution. Central and South Burma, Shan States, Yunnan, Siam and Cambodia.

Nidification. Similar to that of the other races. A series of 15 eggs taken by Herbert in Samkok average 31·7 × 26·6 mm.: maxima 33·2 × 28·0 mm.; minima 30·0 × 25·9 and 31·0 × 25·5 mm.

Habits. Those of the species.

(1686) Athene blewitti.

THE FOREST SPOTTED OWLET.

Heteroglaux blewitti Hume, Str. Feath., i, p. 468 (1873) (Phuljan State, West India).
Athene blewitti Blanf. & Oates, iii, p. 303.

Vernacular names. None recorded.

Description. Very similar to *Athene b. brama* but with fewer white spots on the upper parts; the crown, back and scapulars are generally unspotted, though the forehead and, sometimes, the crown show faintly a few small spots; the collar of white spots on hind-neck is not nearly so well defined; the lesser wing-coverts and often the median are unspotted; below, the breast-band across the throat is wider and more conspicuous and the whole under surface shows more brown and less white, the breast being brown with merely white fringes to the feathers.

Colours of soft parts. Iris bright yellow; bill not recorded but apparently as in *A. b. brama*.

Measurements. Wing 146 to 149 mm.; tail 63 to 69 mm.; tarsus 26 mm.; culmen 20 to 21 mm.

Third or fourth quill longest or subequal; first quill about equal to eighth or a little shorter.

Distribution. Phuljan, near Sambalpur; Udet River in Karial, about 150 miles South of Phuljan and Khandesh.

Nidification. Unknown.

Habits. Nothing recorded beyond the fact that this Owl is essentially a bird of deep forest.

Athene noctua.

Strix noctua Scop., Ann. I. Hist.-Nat., p. 22 (1769).

Type-locality: Sweden.

The typical form is very much darker than any of those found in India.

Key to Subspecies.

A. Paler and smaller; wing 156 to 168 mm. . . *A. n. bactriana*, p. 442.
B. Darker and larger; wing 169 to 173 mm. . . *A. n. ludlowi*, p. 443.

(1687) Athene noctua bactriana.

HUTTON'S OWLET.

Athene bactriana Hutton, J. A. S. B., xvi, p. 776 (1847) (Candahar); Blanf. & Oates, iii, p. 303.

Vernacular names. None recorded.

Description. Lores, face and feathers round the eye white; ear-coverts pale brown; chin, throat and sides of neck white; upper parts sandy-brown; the crown and nape spotted with small longitudinal markings of white; hind-neck with very large white spots forming a conspicuous collar; back and wings with rather smaller white spots becoming white bands on some of the coverts; primaries barred white and brown, the tips of the inner webs having bars of dark brown and paler mottled brown; outer secondaries like the inner primaries gradually grading into the colour of the back; a narrow brown bar across the throat and behind the white sides of the neck; remainder of lower surface white or fulvous-white streaked with reddish-brown, the centre of the abdomen, vent and leg-plumes white; under wing-coverts and axillaries white.

Colours of soft parts. Iris pure sulphur-yellow; bill greenish-yellow, cere pale greenish-white; feet greenish, claws horny-black (*Stoliczka*).

Measurements. Wing 156 to 168 mm.; tail 84 to 87 mm.; tarsus about 32 mm.; culmen 18 to 20 mm.

Young birds are paler, more streaked with white above and on the wings.

Distribution. Afghanistan, Baluchistan and Persia. Birds from Mesopotamia are hardly distinguishable but seem to average somewhat darker, more especially those from the hills. It is difficult to separate *A. n. lilith* from *A. n. bactriana*. In India it only occurs as a straggler to the extreme North-West.

Nidification. In Mesopotamia this little Owl breeds in great numbers in holes in high cliffs and in banks of the bigger rivers and, less often, in walls, buildings and trees. In Persia it preferably builds in old or ruined houses and mosques. The eggs number four to six and the few I have been able to measure vary between 29·8×25·5 and 33·6×29·0 mm. The breeding months seem to be from the end of March to May.

Habits. This Little Owl is a much bolder, more voracious bird than our Indian species of *Athene*. Its food consists of small birds and mammals but when hungry it attacks birds of considerable size and in countries where game is preserved is one of the

greatest pests possible. It is very diurnal in its habits and will sit exposed to the sun without appearing to mind the heat and glare, often feeding also by daylight. In flight and voice it resembles our Indian Spotted Owlets but it is not so familiar a bird nor such an inveterate haunter of inhabited buildings.

(1688) Athene noctua ludlowi.

THE TIBET OWLET.

Athene noctua ludlowi Stuart Baker, Bull. B. O. C., xlvii, p. 58 (Nov. 1926) (Rhamtso Lake, Tibet).

Vernacular names. *Ugpa* (Tibet).

Description. In colour this Owl is intermediate between *A. n. noctua* and *A. n. bactriana*, in fact very close to *A. n. plumipes* from Shensi in China, though much bigger than that bird.

The amount of feathering on the toes varies somewhat individually and a great deal seasonally; birds in Winter generally have the plumelets extending down almost to the claws.

Colours of soft parts. Iris yellow; bill light yellow; legs grey, soles yellow (*F. M. Bailey*).

Measurements. Wing 169 to 173 mm.; tail 88 to 96 mm.; tarsus 31 to 32 mm.; culmen 18 to 20 mm.

Distribution. Tibet. A specimen from the Mishmi Hills, South of Tibet, is exceptionally dark, but there is only the one specimen from these hills and it seems to be nearest the present race in colour.

Nidification. Two eggs sent me from Tibet were taken from a hole under the eaves of an uninhabited house on the 9th of May at Gyantse, an elevation of about 12,000 feet. They measure 37·9 × 29·0 and 36·6 × 28·9 mm.

Habits. Mr. F. Ludlow writes: "This little Owl is not uncommon throughout the year at all elevations between Gyantse and Phari. It may be seen sunning itself in Winter on the walls of ruined buildings, which are so plentiful in this country."

Genus GLAUCIDIUM.

Glaucidium Boie, Isis, 1826, p. 976.

Type, *Strix passerina* Linn. Central and North Europe.

The genus *Glaucidium* differs from *Athene* in having the upper plumage barred instead of spotted; the cere is swollen and the nostrils tubular; the tarsus is feathered and the toes covered above with bristles; the wing is rather more rounded than in *Athene*, having a very short primary and having the third, fourth or fifth quill longest or the three subequal.

The genus is represented throughout the Old World and also in Central and South America.

Key to Species.

A. No collar; wing over 110 mm.
  a. Abdomen longitudinally striated.
    a'. Back and wings olive- or rufous-brown. *G. cuculoides*, p. 444.
    b'. Back and wings chestnut ..... *G. castanotum*, p. 447.
  b. Abdomen barred transversely ..... *G. radiatum*, p. 448.
B. A distinct collar; wing under 105 mm..... *G. brodiei*, p. 450.

Glaucidium cuculoides.

The division of this widely-spread species into subspecies seems to be imperative. It is true that individual variation is great but the magnificent series from all parts of the Indian Empire which are available for comparison in the British Museum show that we have considerable consistency in certain characters in the various areas. Thus the typical form from Nepal and the countries to the West is a very dark brown bird, that from Assam and Northern Burma is dark and rufous and that from Tenasserim pale and rufous. Curiously enough, however, the birds of Sikkim are often barely separable in colour from those of Tenasserim. I therefore admit four races but await more material before naming the Sikkim birds.

Key to Subspecies.

A. Dark brown in tone, heavily barred below . *G. c. cuculoides*, p. 444.
B. Dark rufous-brown in tone, more streaked on abdomen.
  a. Darker and more rufous; wing 141 to 162 mm. ..... *G. c. rufescens*, p. 445.
  b. Paler and less rufous; wing 133 to 143 mm. . *G. c. brugeli*, p. 446.
C. Paler and more fulvous-brown in tone and much streaked below ..... *G. c. fulvescens*, p. 447.

(1689) Glaucidium cuculoides cuculoides.

THE WESTERN HIMALAYAN BARRED OWLET.

Noctua cuculoides Vigors, P. Z. S., 1830, p. 8 (Simla-Almora Districts).
Glaucidium cuculoides. Blanf. & Oates, iii, p. 305 (part).

Vernacular names. *Burra Dundul* (Hind.); *Tanpum* (Lepcha).

Description. Lores grey, the bristles tipped with black; a narrow white supercilium as far back as the eye; whole upper plumage, sides of head and neck and the wing-coverts dull brown or olive-brown, only faintly tinged rufous and closely barred with fulvous- or dull rufous-white; tail dark brown with six whitish or pure white cross-bars and white tip; rarely a few white spots showing on the hind-neck; scapulars with some broad white marks on the outer webs, not very conspicuous; greater and median wing-coverts tipped with white; edge of shoulder of wing white; primaries

barred dark brown and whitish, more boldly on the edge of the outer web, more obscurely on the inner; innermost secondaries like the back; chin, moustachial streak and a patch on the throat pure white; breast and flanks barred dark brown and dull fulvous-white; upper abdomen and posterior flanks with paler brown and pure white bars, the centre of the abdomen, vent and under tail-coverts more streaky than barred in appearance.

Colours of soft parts. Iris bright yellow; bill yellowish-green or pale green, darker at the base; cere dull brown or greenish-brown; feet greenish-yellow, the claws much darker.

Measurements. Wing 145 to 162 mm.; tail 79 to 90 mm.; tarsus about 24 to 26 mm.; culmen about 19 to 22 mm.

Young birds are generally more rufous than the adults and have the head and neck spotted, rather than barred, with pale rufous; the lower parts are all streaked instead of barred, though the breast soon becomes so.

Distribution. The North-West lower ranges of the Himalayas from Murree and Mussoorie through the Simla States and Garhwal to Eastern Nepal.

Nidification. This Barred Owlet breeds from the foot-hills of the Western Himalayas up to about 7,000 or 8,000 feet. The eggs are always laid in natural hollows in large trees either standing in forest or in well-wooded country close to forest. The usual clutch is four but often three only are laid and, very rarely, five. Thirty eggs average 35·8×30·4 mm.: maxima **38·5×31·2** and 37·1×**31·4** mm.; minima **35·0**×29·6 and 35·2×**29·0** mm.

Habits. This species is, perhaps, the most diurnal of all Owls. It feeds normally up to ten or eleven o'clock in the morning and commences again as soon as the heat of the day is over. In the hottest hours it seeks the forest or some densely-foliaged tree in the open. Its diet is in great part insectivorous, beetles and grasshoppers, the latter of which it catches both on the wing and from the ground. It also when hard pressed eats rats, mice, small birds and lizards. Its flight is strong and less dipping than that of most Owls and it flies about without embarrassment in the sunniest hours. The note is a really very beautiful rippling call: a whistle consisting of notes running into one another and dying gradually away. It has also a good range of low chuckling notes, an angry scream and the usual growls when frightened.

(1690) Glaucidium cuculoides rufescens.

THE BURMESE BARRED OWLET.

Glaucidium cuculoides rufescens Stuart-Baker, Bull. B. O. C., xlvii, p. 59 (Nov. 1926).
Glaucidium cuculoides. Blanf. & Oates, iii, p. 305 (part).

Vernacular names. *Dao-ku-ra-ru-ru* (Cachari).

Description. A very much more richly-coloured bird than the preceding, the general tint being that of a rufous-brown bird; the underparts show the rich rufous tint even more strongly than the upper; the breast is more streaked and less barred.

Colours of soft parts as in the other races.

Measurements. Wing 141 to 162 mm.

Distribution. Sikkim; Bhutan Duars; Assam to East of the Dibong and South of the Brahmaputra, Manipur, Tippera and Chittagong in Eastern Bengal; Northern Burma to Pegu; North and South Shan States. This form is close to *G. c. brugeli* * from Siam but is consistently more rufous and darker above and averages a good deal bigger. A bird from Karenni seems referable to the latter form.

Nidification. Similar to that of the last, but this race occasionally lays five eggs. Forty eggs average 36·5 × 30·5 mm.; maxima **39·2** × 31·0 and 38·7 × **31·5** mm.; minima **33·2** × **30·0** mm.

Habits. Those of the species. In Assam this Owl often frequents bamboo-jungle, feeding on a species of small mouse which also frequents such places.

(1691) Glaucidium cuculoides brugeli.

THE SIAM BARRED OWLET.

Glaucidium cuculoides brugeli Parrot, Orn. Gesell. in Bayern, viii, p. 104 (1907) (Bangkok).

Vernacular names. None recorded.

Description. Similar to the preceding bird but less dark brown above, less rufous below and also decidedly smaller on an average.

Measurements. Wing 133 to 143 mm.

Colours of soft parts as in the other races.

Distribution. Siam. A bird from Karenni, with a wing of 136 mm., seems nearest this form but this is the only record of its occurrence within our limits.

Nidification. Herbert found this bird breeding freely round about Samkok and took three sets of eggs from natural hollows in large trees. The full clutch appears to be three, seven eggs averaging 34·3 × 30·1 mm. and vary between 33·9 × 29·0 and 36·2 × 30·3 mm.

Habits. Those of the species.

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* Parrot, Orn. Gesell. in Bayern, viii, p. 104 (1907) (Bangkok).

(1692) Glaucidium cuculoides fulvescens.

THE TENASSERIM BARRED OWLET.

Glaucidium cuculoides fulvescens Stuart Baker, Bull. B. O. C., xlvii, p. 60 (Nov. 1926) (Kolidoo, Tenasserim).
Glaucidium cuculoides. Blanf. & Oates, iii, p. 305 (part).

Vernacular names. None recorded.

Description. Differs from the other races in being rather paler and, especially on the lower plumage, more fulvous in general tint. The breast is almost always less heavily barred and the streaks on the abdomen better defined and encroaching on the lower breast.

Colours of soft parts as in the other races.

Measurements. Wing 134 to 150 mm. (once 153 mm.).

Distribution. Tenasserim.

Nidification. Bingham took eggs of this Owl in Tenasserim in April and May. The six eggs sent to Hume measure from 33·0 × 28·7 to 35·1 × 30·2 mm.

Habits. Those of the species.

(1693) Glaucidium castanotum.

THE CHESTNUT-BACKED OWLET.

Athene castanota Blyth, Cat. B. Mus. A. S. B., i, p. 39 (Dec. 1852) (Ceylon).
Glaucidium castanonotum. Blanf. & Oates, iii, p. 307.

Vernacular names. *Panchi-bassa* (Cing.); *Natta* (Tam.).

Description. Generally very similar to *G. c. cuculoides* but the back and wings chestnut with the dark markings showing through only faintly; the white on the scapulars is less in extent and tinged with rufous; the pale bars on the head are narrow and are rufous-ochre; the dark bars and streaks on the lower parts practically black instead of brown and the pale breast-bars rufous-ochre; the abdomen, vent and under tail-coverts are very white, contrasting strongly with the dark streaks.

Colours of soft parts. Iris yellow; bill yellowish or greenish horn-colour; cere dusky greenish; legs greenish-olive, the soles paler and more yellow.

Measurements. Wing 122 to 132 mm.; tail 56 to 65 mm.; tarsus 25 to 28 mm.; culmen 17 to 18 mm.

Distribution. Ceylon only.

Nidification. This Owl is said to breed during March, April and May, laying two eggs in holes in trees or coconut-palms. Two eggs in the British Museum measure 35·8 × 29·2 and 34·0 × 27·4 mm.

Habits. This handsome Owlet is found over the greater part of the island of Ceylon except in the drier northern tracts. It occurs in the plains and up to 6,000 feet at Newara Eliya. It appears to be more of a forest bird than *G. cuculoides* and though not rare, even in the vicinity of Colombo, keeps to the heavier jungle and wooded country. It feeds on insects, small reptiles, mammals and birds and its note is said to be a single soft "kraw."

Glaucidium radiatum.

Key to Subspecies.

A. General tone not rufous ..... *G. r. radiatum*, p. 448.
B. General tone distinctly rufous..... *G. r. malabaricum*, p. 449.

(1694) Glaucidium radiatum radiatum.

The Jungle Owlet.

Strix radiata Tickell, J. A. S. B., ii, p. 572 (1833) (Borabhoom).
Glaucidium radiatum. Blanf. & Oates, iii, p. 307 (part).

Vernacular names. *Jangli Choghad* (Hind.); *Kala kasut* (Oudh); *Chota Kalpencha* (Beng.).

Description. Lores and short eyebrows white, the loral bristles black-tipped; whole upper plumage, wing-coverts and inner secondaries dark brown barred with narrow bars of pale ochreous or rufous, the bars on the back, rump and upper tail-coverts and wings often becoming practically pure white making these parts look grey instead of rufous-brown; tail blackish-brown with about nine narrow white bars; scapulars broadly marked with white; greater and median wing-coverts with bold white marks on the outer webs; primaries and outer secondaries dark brown, banded with fulvous or rufous and broadly rufous at the bases of the inner webs, forming a broad fulvous or rufous under-wing patch; chin, moustachial streak and a patch on the throat pure white; remainder of underparts white, always more or less rufous down to the breast and paling to pure white on the vent and abdomen; the whole of these parts barred with blackish-brown, very closely on throat, neck and breast and then wider and wider apart to the vent.

Colours of soft parts. Iris yellow, occasionally brown; bill yellowish- to greenish-horny; cere dull green; legs and feet dull green or greenish-brown, the soles yellowish.

Measurements. Wing 127 to 134 mm.; tail 66 to 74 mm.; tarsus 24 to 25 mm.; culmen 15 to 16 mm. The sexes do not differ in size.

Distribution. Throughout the greater part of India in well-wooded and forest tracks as far South as Khandesh, in the Bombay Presidency, in the West and the Godavery on the East.

It does not occur in the Punjab, Sind and Rajputana, except at Mount Aboo; whilst in the Bombay Deccan, Western and Central Provinces it is rare. Specimens from the Nilgiris, possibly obtained at considerable elevations, seem to be of this race.

Nidification. Bulkley took eggs of this Owl as early as the 24th February; over the greater part of its range, however, it lays in April and early May. It deposits its eggs, two to four in number, in hollow trees in jungle, preferably rather thin deciduous forest but sometimes in quite dense evergreen forest, this more especially in the lower hills of the Himalayas, in which it breeds up to about 4,000 feet, though this is exceptional. Twenty-eight eggs average 31·5 × 26·8 mm.: maxima **34·2** × 27·3 and 31·3 × **27·5** mm.; minima **30·6** × 26·4 and 31 × **26·0** mm. The holes selected are generally natural ones, less often deserted holes of Barbets or Woodpeckers.

Habits. The present species is found in the plains where well-wooded and in the lower ranges and warmer valleys of the Himalayas up to about 4,000 feet. It is less diurnal than the Barred Owlets but is often seen during the daytime. It is chiefly insectivorous in its diet but also eats small mammals and many birds the size of a Sparrow or bigger. Its note is said to be "a pleasant and protracted one" and it has also been likened to the distant cry of a Sarus Crane. It is a bird of the forest, though most often of light forest or of thick orchards and seldom comes into gardens or open cultivated country.

(1695) Glaucidium radiatum malabaricum.

THE MALABAR JUNGLE-OWLET.

Glaucidium malabaricum Sharpe, Cat. B. M., ii, p. 218 (1883) (Malabar).
Glaucidium radiatum. Blanf. & Oates, iii, p. 306 (part).

Vernacular names. *Jangli Choghad* (Hind.); *Adavi-paini-gante* (Tel.); *Nattah* (Malabar).

Description. Differs from the preceding bird in being much darker and much more rufous; the most rufous Southern birds are not only much more rufous than any Northern birds but are also darker and richer in colour both above and below; the least rufous birds, though perhaps but little more rufous than the most rufous specimens from the North, also differ in this respect.

Colours of soft parts as in the previous race.

Measurements. Wing 120 to 133 mm.; tail 64 to 70 mm.; tarsus about 24 to 27 mm.; culmen, ♂ 15 to 16 mm., ♀ 17 to 18 mm.

Distribution. South India and Ceylon. Birds from Khandesh are somewhat intermediate and various individuals from that district might be assigned to either race.

Nidification. The Malabar Jungle-Owlet breeds in Travancore

and Southern India in February, March and, less often, April, laying three or four eggs in similar places to the last bird. In Ceylon its eggs have not yet been found. Thirty eggs average 30·4 × 26·4: maxima 32·2 × 26·7 and 31·3 × 27·7 mm.; minima 27·2 × 25·4 and 30·0 × 25·3 mm.

Habits as in the preceding bird. Legge syllabifies its call as "kāow," slowly repeated and gradually accelerated until changed to "kāow whap, kāow whap," which increases in loudness until suddenly stopped.

Glaucidium brodiei.

This little Owl has a most perplexing assortment of variations which cannot be attributed to geographical distribution, age or sex. The normal specimen in the North-West of India is neither very grey nor very rufous, though there is considerable range of variation among the individuals even here, and now and then a very rufous specimen is obtained, one such having no markings on the back. In Nepal and Sikkim very rufous birds at once become the dominant form, yet the grey specimens from these countries are a purer darker grey than any from the North-West. Leaving Sikkim and working East and South, we find a smaller percentage of rufous birds and also fewer of the pure dark grey type, but from Nepal to Formosa and China there seems to be no one character sufficiently constant to enable one to divide the species geographically. As between the North-West birds and all others, there does appear to be the one constant character of depth of colour. The shades of rufous may vary, the amount of spotting on the back or the distribution and colour of the spots and streaks on the lower plumage; through all these variations, however, we find that the North-West birds average much paler, the Eastern and Southern birds much darker, owing to the former having the dark bars more brown whilst the latter have them more black.

Key to Subspecies.

A. Paler ..... *G. b. brodiei*, p. 450.
B. Darker ..... *G. b. tubiger*, p. 451.

(1696) Glaucidium brodiei brodiei.

THE WESTERN COLLARED PIGMY OWLET.

Noctua brodiei Burton, P. Z. S., 1835, p. 152 (Himalayas, restricted to Simla).
Glaucidium brodiei. Blanf. & Oates, iii, p. 307 (part).

Vernacular names. None recorded.

Description. A well-defined supercilium, face and lores white, the loral bristles black-tipped; crown, nape, ear-coverts and sides

GLAUCIDIUM BRODIEI BRODIEI. 2/3.
The Western Collared Pigmy Owlet.

Oct Nainital I saw one of these
pigmy owlets perched at the top
of his head in such a way as to
make me think I was his face.
He kept turning his head around
& showing his real face & then
looking forward again.

It is the size of a Sparrow.

Song

a Tonk . Tonk

Song ½ min

GLAUCIDIUM BRODIEI TUBIGER. 2/3.
The Eastern Collared Pigmy Owlet.

of neck dull brown, marked with broken bars and spots of whitish-fulvous or rufous of various shades; a broad fulvous or rufous collar on the hind-neck, the feathers edged with dark brown and with black bases which show through and form a large black patch on either side of the neck; scapulars with white outer webs forming a bold streak on either side of the back; remainder of upper parts brown barred with whitish-fulvous to rufous; wing-coverts and inner secondaries like the back; edge of wing white; primaries blackish, the first two unmarked, the others increasingly notched with some shade of rufous on the outer webs and barred with white on the base of the inner webs; tail dark brown with narrow bars of some shade of rufous; chin, moustachial streak and patch on throat white; remainder of lower plumage white, fulvous- or rufous-white, with broad dark brown bars on breast and flanks, becoming fewer in number, more like drops in shape, on the abdomen; under tail-coverts white with dark brown bars near the tips.

Colours of soft parts. Iris straw- to golden-yellow; bill greenish-yellow, darker at the base and greener on the cere; legs and feet dull yellowish-green, the claws darker, the soles paler and more yellow.

Measurements. Wing 90 to 101 mm.; tail 57 to 66 mm.; tarsus about 23 mm.; culmen about 13 to 14 mm.

Distribution. The Himalayas from Murree to Western Nepal; common in Garhwal and the lower ranges of the Simla States. It is not possible to determine the localities of Burton's types, but in all probability they all come from the North-West, so the type-locality has been restricted as above.

Nidification. This little Owl breeds in the North-West Himalayas between 3,000 and 7,000 feet in holes in trees standing either in forest or in well-wooded open country. Sometimes natural hollows are selected, at other times the deserted nesting-holes of Woodpeckers and Barbets. The eggs number from two to five, as Whymper took the former number hard-set and Rattray took one clutch of the latter. Twenty eggs average 29·7 × 24·1 mm.: maxima 31·5 × 24·2 and 29·4 × 25·4 mm.; minima 28·0 × 23·0 mm. The breeding months are May and June.

Habits similar to those of the next race.

(1697) Glaucidium brodiei tubiger.

THE EASTERN COLLARED PIGMY OWLET.

Noctua tubiger Hodgs., As. Res., xix, p. 175 (1836) (Nepal).
Glaucidium brodiei. Blanf. & Oates, iii, p. 307 (part).

Vernacular names. *Dao-whit-whit* (Cochari).

Description. Similar to the preceding but with the dark bars

more blackish and less brown, so that whatever phase of colour the individual may represent he appears darker than does a bird of similar phase from the North-West. Amongst Nepal, Sikkim and the Himalayas Eastwards the most common phase is the deep rufous but there is another form, especially in Sikkim, practically devoid of all rufous or fulvous tinge, so that the bird appears dark brown with narrow white bars and a white collar; in this type also the lower plumage is very white and the markings sparser and more drop-like, less bar-shaped than in the rufous specimens.

The four specimens depicted in the two plates will, perhaps, do more to show the extraordinary variations of this small Owl than many pen pictures.

Blanford suggests that the phase with an unmarked rufous back and streaked head may be that of the young. Young birds, however, taken by myself from the nest were fully barred on the back like the adults but had the head frequently streaked. More nestlings are badly wanted.

Colours of soft parts as in the preceding race.

Measurements. Wing 89 to 96 mm.; culmen about 13 mm.

Distribution. Nepal East to Assam, Manipur, Burma, Tenasserim, Malay Peninsula, China and Formosa.

Nidification. In South Assam the Pigmy Owlet commences to breed in the end of March whilst second broods may be found up to the end of July but most eggs are laid in April and May. Any hollow will do for the eggs. I have seen natural hollows, a couple of feet wide and deep, sometimes used; others, again, with barely room for four lusty young ones. Sometimes, also, nest-holes of Barbets and Woodpeckers are used, the rightful owners being ruthlessly expelled and not always escaping with their lives. Preference is given to holes high up in trees and in the branches rather than in the trunk or main boughs. Occasionally, however, it is quite low down. The eggs number two to five, generally four, and twenty-five average 28·0 × 23·5 mm.: maxima 29·1 × 25·2 mm.; minima 26·5 × 22·0 mm.

Habits. This handsome little Owl keeps very much to dense forest or to huge densely-foliaged trees on its outskirts. It is very nocturnal in its habits and during the daytime sits concealed in the thickest foliage it can find, but occasionally in the mornings and evenings it may be seen on a high bare branch, sitting very humped-up, looking like a natural excrescence until it moves its head. Its call is a musical four-note whistle, a distinct interval between the first and second and the third and fourth, but none between the second and third. It is exactly like the call of the green tree-frog but the latter gives all four notes rapidly. It is also very ventriloquistic and hard to locate; the bird commences very softly and sounds miles away and then the notes come louder and louder until one finds the bird is sitting overhead.

Its principal diet is insects, but it is a bold little bird and a great destroyer of nestlings. In their own nest-holes I have seen remains of Barbets, Woodpeckers, Minivets, Magpie-Robins, etc., as well as those of mice, shrews, rats and lizards. The flight is the usual silent, flip-flap flight of all Owls but perhaps less dipping and more direct than most.

Genus **NINOX.**

Ninox Hodgson, Madr. Journr Lit. Sci. v, p. 23 (1837).

Type, *Ninox lugubris* Tickell.

In this genus there is no ruff or facial disk and the resemblance to a Hawk is very great. The cere is swollen and the non-tubular nostril placed close to the anterior margin; the wings are longer and more pointed than in *Athene* or *Glaucidium*, the third and fourth primaries longest and the first about equal to the seventh; the tail is moderately long and rounded at the tip; the tarsus is feathered, the upper surface of the toes thinly covered with bristles.

Key to Species.

A. Lower plumage white, partly brown or rufous; quills barred ..... *N. scutulata*, p. 453.
B. Lower plumage almost entirely brown; quills not barred ..... *N. obscura*, p. 457.

Ninox scutulata.

Strix scutulata Raffles, Trans. Linn. Soc., xiii, p. 280 (1822).

Type-locality: Sumatra.

The typical form differs from our Indian races in being darker with a more definite dark cap contrasting with the paler back and with very richly coloured under plumage.

Key to Subspecies.

A. Under wing-coverts white or rufous boldly barred with dark brown.
  a. Wing over 208 mm.
    a'. Paler with a much greyer head, paler and more grey than the back. *N. s. lugubris*, p. 454.
    b'. Darker; the head more brown and as dark, or darker than, the back .... *N. s. burmanica*, p. 455.
  b. Wing under 208 mm. ..... *N. s. hirsuta*, p. 457.
B. Under wing-coverts orange-buff with little or no barring.
  c. Wing over 180 mm. ..... *N. s. isolata*, p. 456.
  d. Wing under 170 mm. ..... *N. s. affinis*, p. 456.

(1698) Ninox scutulata lugubris.

THE INDIAN BROWN HAWK-OWL.

Strix lugubris Tickell, J. A. S. B., ii, p. 572 (1833) (Dholbhum, Bengal).
Ninox scutulata. Blanf. & Oates, iii, p. 309 (part).

Vernacular names. *Kal Péchak*, *Pencha* (Beng.); *Moh-sorai* (Assam); *Tang-kyi-per-chi-ok* (Lepcha); *Choghad-Bezra* (Hind.).

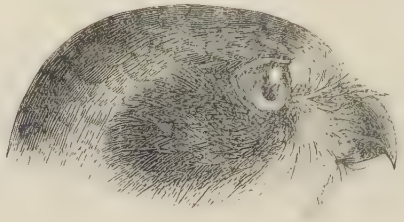

Fig. 71.—Head of *N. s. lugubris.* ¾.

Description. Lores and forehead white, the bristles black or black-tipped; crown, sides of head and the neck pale grey-brown, palest next the forehead and grading gradually into the purer brown of the back, rump, upper tail-coverts and wing-coverts; scapulars with large patches of white on the centres of the feathers, often nearly concealed; edge of shoulder of wing white; outer primaries brown, faintly marked with paler on the outer webs and more distinctly on the basal two-thirds of the inner webs; secondaries immaculate on the outer webs but more boldly marked on the inner webs, the small secondaries next the scapulars having the almost white bars extending well on to the outer webs also; tail banded dark brown and light brown with whitish tips, dark bars generally five in number; chin white; throat and fore-neck fulvous streaked with brown; remainder of lower plumage white, all but the vent and under tail-coverts with large drops of light, rufescent brown; axillaries and under wing-coverts whitish to buff or rufous, profusely barred with dark brown.

Colours of soft parts. Iris bright golden-yellow; bill horny-slate or bluish-black, the tip paler; cere dull green or greenish-brown; feet dull yellow or yellowish-green.

Measurements. Wing 215 to 227 mm.; tail 124 to 135 mm.; tarsus about 24 mm.; culmen about 21 to 22 mm.

Distribution. Northern India from Murree on the West (*Rattray*) and Garhwal (*Whymper*), East to Western Assam, North of the Brahmaputra; South to the Bombay Presidency, Central Provinces, Bengal and Orissa. In the centre of the

Bombay Presidency this race meets *hirsuta* and individuals are generally intermediate.

Nidification. Osmaston appears to be the only naturalist who has taken the eggs of this bird. He found four hard-set eggs in a large hole about 8 feet up in a Mango-tree in a compound at Dehra Dun on the 1st July. They measure from 36·2 × 30·1 to 36·2 × 30·9 mm.

Habits. In the greater part of the Himalayas these Owls are generally frequenters of quite dense forest but wherever there are villages and open country they are to be seen in their vicinity, though by day they keep to the densest-foliaged trees they can find. In the plains, however, they are to be found wherever there are plenty of trees and sufficient protection from daylight. Their ordinary note is a soft "whoo-hoot," twice or thrice repeated, but they probably have as great a variety of calls as the Eastern race. They are said to be almost entirely insectivorous and to sometimes catch their prey on the wing.

(1699) Ninox scutulata burmanica.

THE BURMESE BROWN HAWK-OWL.

Ninox burmanica Hume, Str. Feath., iv, p. 386 (1876) (Pegu).
Ninox scutulata. Blanf. & Oates, iii, p. 309 (part).

Vernacular names. *Moh-sorai* (Assam).

Description. Differs from the preceding race in being darker both above and below; the head is as dark or darker than the back and much less grey; on the lower plumage the dark markings are usually richer and larger but individual variation in this respect is considerable.

Colours of soft parts as in the other races.

Measurements. Wing 206 to 222 mm.; tail 128 to 134 mm.; tarsus about 24 to 25 mm.; culmen about 21 to 22 mm.

Distribution. Assam South of the Brahmaputra, Burma, Shan States, North and Central Siam as far as Bangkok and according to Kloss (Ibis, 1918) still farther South. Birds from the Malay States (*malaccensis*) are intermediate between the typical and the present form.

Nidification. Coltart and I found this Owl breeding in some numbers in South and East Assam from practically the level of the plains up to 4,000 feet and, less often, up to 5,000 feet. The hole selected is usually one in a big tree but not high up, more often under than over twenty feet from the ground. The tree may be one in forest but the birds seem to prefer thin jungle, trees near villages more or less surrounded by forest or dead trees killed for the purposes of cultivation. The full clutch is three or four eggs, rarely two or five. Fifty eggs average 35·1 × 29·5 mm.: maxima **38·0** × 31·6 and 37·0 × **32·0** mm.; minima **33·1** × 29·3 and

34·3 × 28·0 mm. The bird is a very close sitter and may often be caught on the nest. The breeding-season is April and May, a few eggs being laid in March and a few in June.

Habits. This Hawk-Owl is more a bird of forests than the Indian form but keeps much to the outskirts, glades, edges of streams, etc. where it is open. They also commonly frequent large, shady trees round villages and cultivated tracts. They are nocturnal Owls and seem very confused when caught by sunlight, though not so incapable of action as some Owls. Their ordinary call is like that already described of the Indian bird but they have a large additional vocabulary. On the nest they utter a constant wheeze as if they had asthma and the young have a similar higher-pitched note. When angry they growl like other Owls and they also during the breeding-season caterwaul rather like the Barn-Owl, though they never utter the horrible screams of the Bay-Owl. Their food is more exclusively insectivorous than most Owls but they occasionally also feed on mice, small birds, frogs and lizards and I once found the remains of a small grass-snake in a nest.

(1700) Ninox scutulata affinis.

THE ANDAMAN BROWN HAWK-OWL.

Ninox affinis Tytler, Beavan, Ibis, 1867, p. 285 (Port Blair, Andamans).
Ninox scutulata. Blanf. & Oates, iii, p. 309 (part).

Vernacular names. None recorded.

Description. Differs from the other races in its small size, very brown upper plumage and unusally bright rufous-brown spotting on the abdomen and breast. In this race the under wing-coverts and axillaries are generally almost unspotted orange-rufous; but the wing-coverts occasionally are more or less barred.

Colours of soft parts as in the other races.

Measurements. Wing 167 to 169 mm.; tail 102 to 106 mm.; tarsus about 27 to 28 mm.; culmen about 20 mm.

Distribution. Andamans.

Nidification. Unknown.

Habits. As far as recorded similar to the next race.

(1701) Ninox scutulata isolata.

THE NICOBAR BROWN HAWK-OWL.

Ninox scutulata isolata Stuart Baker, Bull. B. O. C., xlvii, p. 60 (Nov. 1926) (Camoorta).
Ninox scutulata. Blanf. & Oates, iii, p. 309 (part).

Vernacular names. None recorded.

Description. Similar to *N. s. affinis* but a little browner, less ashy on the upper plumage and much bigger.

Colours of soft parts as in the other races.

Measurements. Wing 185 to 205 mm.; tail 118 to 130 mm.; tarsus about 27 to 28 mm.; culmen about 22 mm.

Distribution. Nicobar, Trinkut and Camoorta Islands in the Nicobar group.

Nidification. Unknown.

Habits. Davison observed and shot a specimen of this Owl hawking moths late in the evening like a Nightjar in low secondary jungle.

(1702) Ninox scutulata hirsuta.

THE SOUTHERN INDIAN HAWK-OWL.

Ninox hirsuta Temm., Pl. Col., 289 (1824) (Ceylon).
Ninox scutulata. Blanf. & Oates, iii, p. 309 (part).

Vernacular names. *Choghad Bezra* (Hind.); *Paini-ganté-vestam* (Tel.).

Description. Very close to *burmanica* but still darker, the head being always darker than the back and more slaty-brown, less red-brown; below, the colouring is very rich and the wing-coverts and axillaries are very profusely barred with dark brown.

Colours of soft parts as in the other races.

Measurements. Wing 188 to 208 mm.; tail 112 to 119 mm.; tarsus about 28 mm.; culmen about 22 mm.

Distribution. Ceylon and Travancore. Birds from Madras, Malabar and the Southern Bombay Presidency are not quite so dark in most cases as Ceylon birds but are certainly nearer to it than to the typical *lugubris* and may conveniently be retained with the present form.

Nidification. Similar to that of the other races. In Ceylon it is said to breed from Christmas to April and in Travancore Bourdillon took eggs in February, March and April but says that they may be found a month earlier and a month later. Two eggs taken by him measure 34·3 × 31·5 and 35·3 × 31·0 mm.

Habits. Those of the species.

(1703) Ninox obscura.

HUME'S BROWN HAWK-OWL.

Ninox obscura Hume, Str. Feath., i, p. 77 (1873) (Andamans); Blanford & Oates, iii, p. 311.

Vernacular names. None recorded.

Description. Forehead mixed black and white; loral bristles grey at the base, black at the tips; tail blackish-brown with

four pale bars and pale tips; under tail-coverts barred dark brown and white; remainder of plumage dark chocolate-brown, paler on the abdomen, where some of the feathers are barred with fulvous, mostly concealed; the head and primary coverts are generally darker and blacker than the rest of the plumage.

Colours of soft parts. Iris yellow; bill blackish, the tips and culmen paler and greenish; cere dull green; legs and feet yellowish, claws black.

Measurements. Wing 197 to 220 mm.; tail 120 to 126 mm.; tarsus about 28 mm.; culmen about 22 to 23 mm.

Distribution. Andamans and Nicobars.

Nidification. Osmaston obtained an egg of this Owl from a hole in a Padouk-tree, about 15 feet from the ground, in open forest. It measures $35{\cdot}3 \times 30{\cdot}4$ mm.

Habits. Nothing on record. It seems to be a very nocturnal form and, though not uncommon, difficult to obtain. Davison only secured two specimens, although the bird was heard calling frequently. The note is a soft double hoot. A young bird kept in captivity by Osmaston was fed on rats and Mynas.

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